Excavating Engineer

founded 1905

OCTOBER
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Rubber-mounted cranes lower a 200-ft. long string of 36-in. gas pipe into a Chicago residential street. For story of Contracting & Material Co. job, see page 26.

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you can just crack an egg

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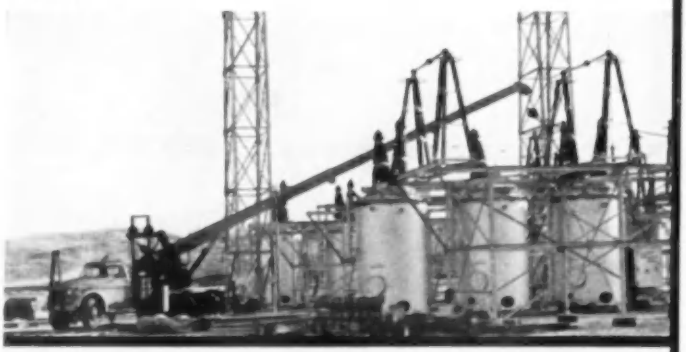

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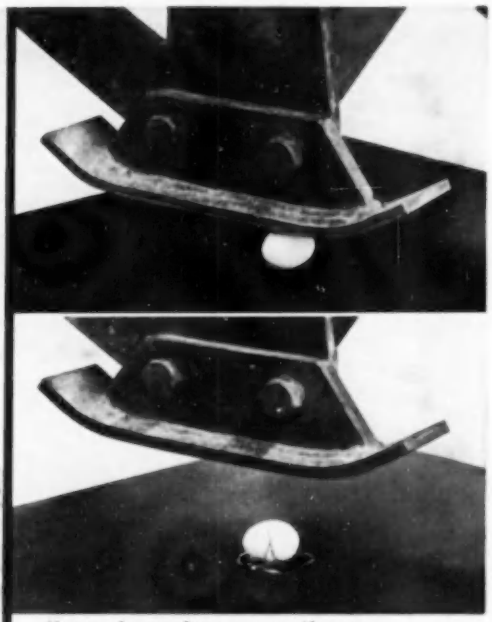

Heavy, heavy hangs over the egg

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7H60

BUCYRUS ERIE

Excavating Engineer

founded 1905

South Milwaukee, Wisconsin

Volume 54 No. 10 **October 1960**

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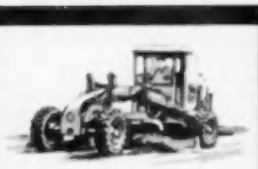

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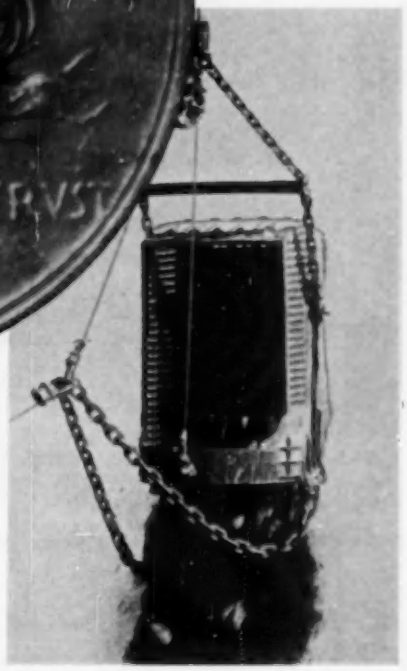

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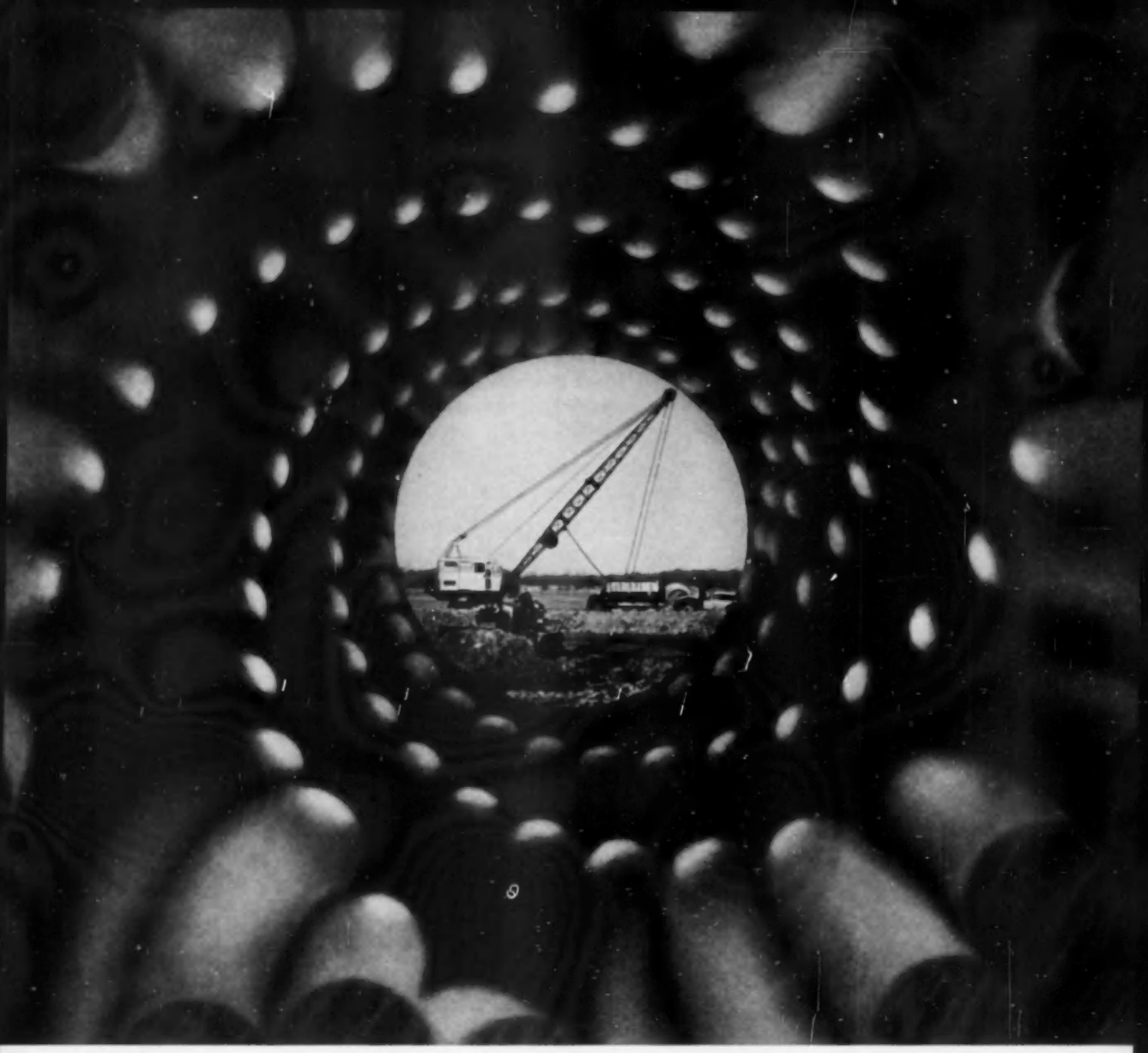

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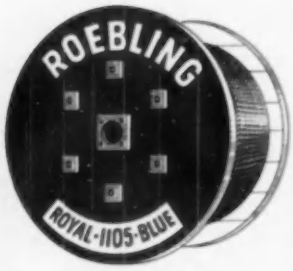

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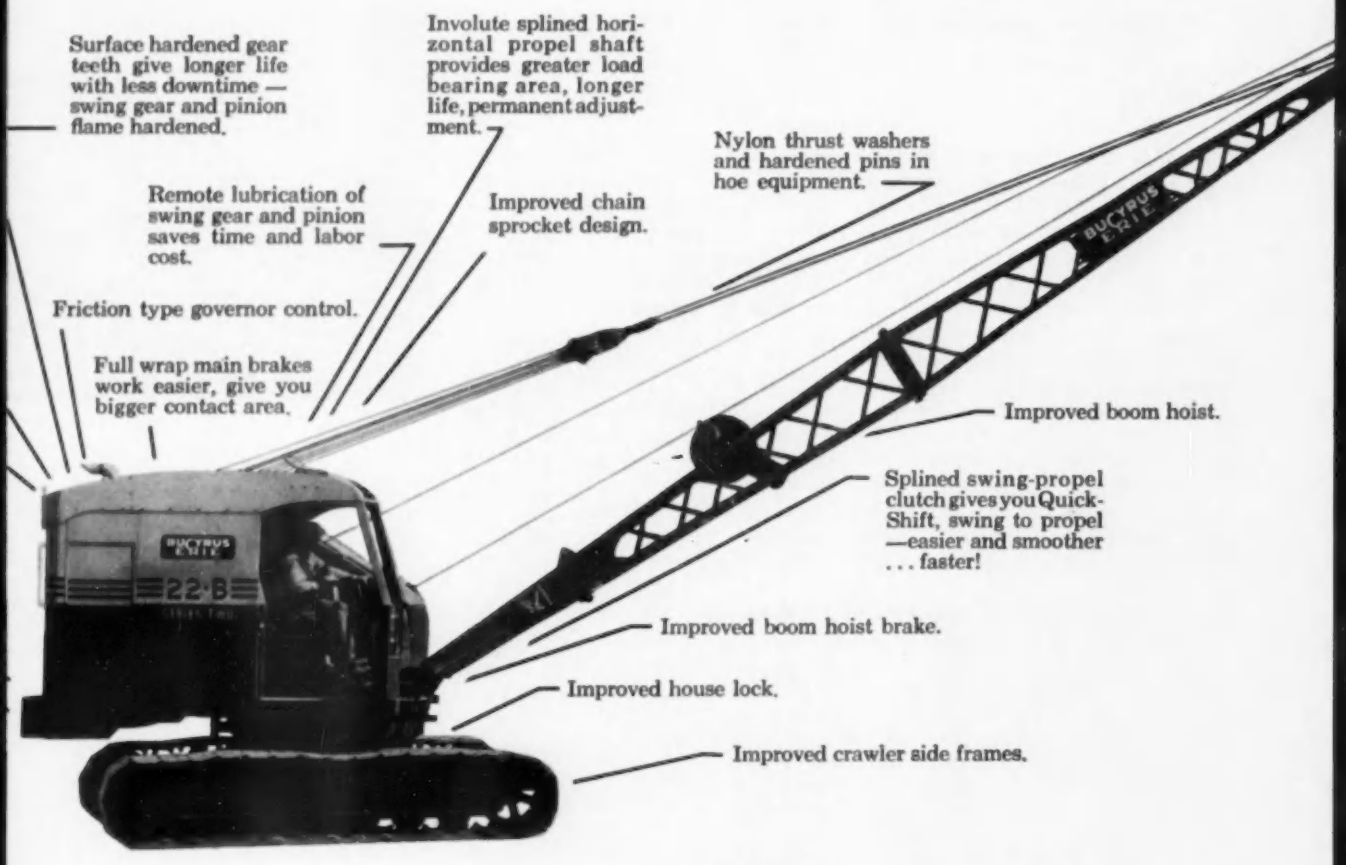
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West Virginia Builds A Bigger Pike

Work on interstate 77 seems like a repeat of an old horror show. Same setting: The rugged mountains that challenged turnpike builders back in '53. Same plot: Put a superhighway where a pack trail shouldn't go.

TALK among construction stiffs on the West Virginia section of interstate highway 77 is that it's like the clock that has been turned back seven years. And some of these hardy men, veterans of that toughest of turnpike jobs, the downstate toll road built in 1953-54, now say the earlier project was an ant-hill caper compared to this one.

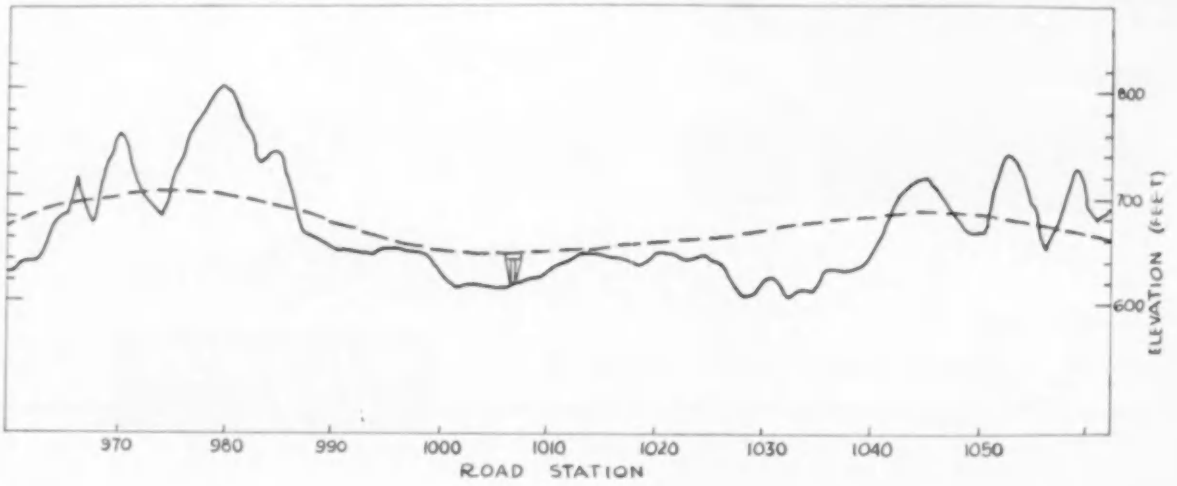
The facts back them up. Excavation on the 88-mile-long West Virginia Turnpike totaled some 25 million cubic yards. The 20-miles of I-77 let so far call for over 16 million cubic yards of earthwork—with some wild stretches yet to come. Turnpike digging averaged about 600,000 yards a mile in the worst sections. The figure comes to almost a million yards a mile for the part of I-77 now under way. As the builders of the 'Pike discovered in 1953, the rugged Mountain State terrain never gives an inch.

Four-Lane Road

Every bit of progress is an uphill struggle. Only this time the battle figures to be twice as tough. I-77 measures four-lanes wide—the turnpike just two.

Despite these handicaps, progress on the new freeway paces a tight timetable designed to cram major grading

Profile of a typical stretch of I-77 in West Virginia shows the massive earth and rock moving job faced by the contractors.



into a short work season. The contractors meet the challenge with bright new techniques.

Powder gangs open the tricky shale with pennies-cheap ammonium nitrate prills that limit hazardous overbreak. Power shovels carve the big cuts, as usual. But they work side by side with rock-lugging scrapers. The way to tame this tiger of a job, opinion runs, is to meet it head on with power—both in machines and methods.

One of the shorter links in the interstate system, and at the same time one of the most far-reaching value, I-77 runs almost due north-south from the Carolinas to the Great Lakes. It is expected to draw much of the traffic seeking a bee-line through the mountains from Florida to the big Ohio cities. West Virginians look forward to its completion, too, so they can by-pass the twists and turns of old US 21.

I-77 slices through the heart of West Virginia (the turnpike forms a leg of the route) and meets I-64 just outside Charleston, the capital city. The section north of this junction, on the route to Parkersburg, is the scene of the current construction. From White Chapel to Fairplain stretch almost 20 miles of bustling machinery. One huge scar after another in the mountain greenery traces the path of the new highway.

At the time *Excavating Engineer* looked over I-77, V. N. Green & Co. held the crown as heavyweight grading champ. Their spread of power shovels and scrapers knocked out 10,000 cubic yards a day, most of it sandstone-laced shale.

H. F. Johnson, superintendent on the job, wastes no time basking in the glory of past output records. Riding herd on a ¾-million-dollar equipment spread scattered over the 3-mile contract section—and trying to squeeze out a few extra payloads here and there—keeps him plenty busy.

He points out the terrain features that give I-77 some of the most spectacular scenery here:

1) Four major cuts including the granddaddy of them all, a 132-ft. deep canyon right through the backbone of a rocky ridge. This cut yielded almost a half-million yards of material.

2) Three big fills, one reaching a top height of 62 feet.

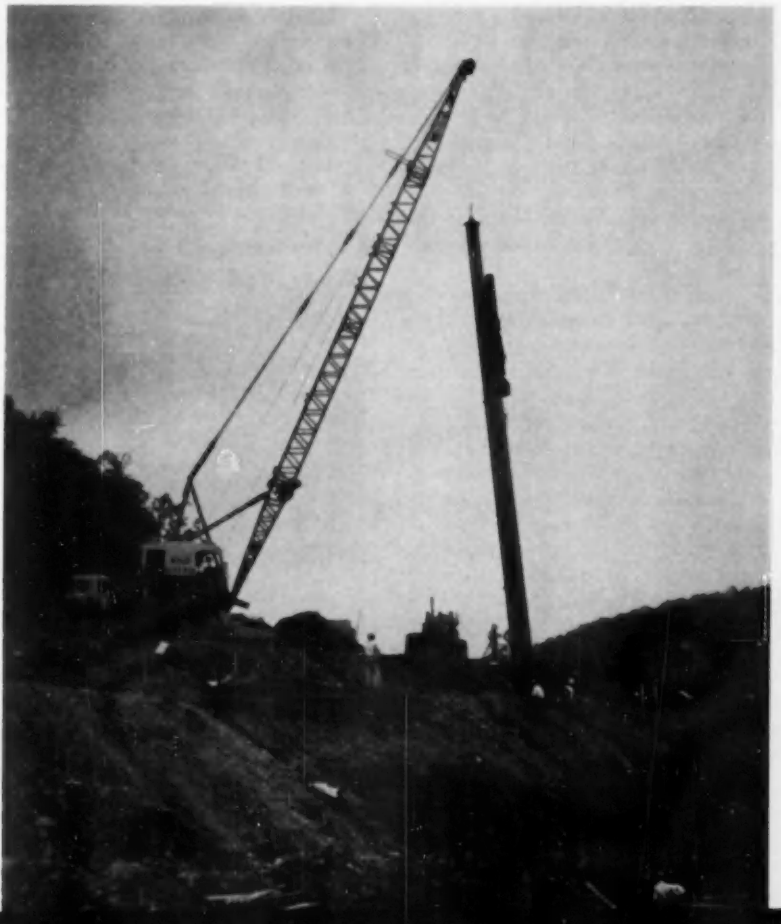
3) A new channel for a quiet creek that has a nasty habit of jumping its banks after every heavy rainstorm.

The unclassified item in the contract comes to 3,550,000 cubic yards, which has been running about 50% rock. Johnson figures he may pull out 10% more than was called for because of overbreak on the slopes.

The blast-hole gang pioneers the cuts right from the top. A Caterpillar dozer clears trees and brush, but al-

(Left) **To tame a wild mountain stream on V. N. Green contract, a task force of dirtmovers shapes a new channel. In foreground, an International TD-24 dozer clears a bench. On the opposite side, a Koehring 605 dragline loads spoil into Euc rear dumps.**

(Below) **Perched on the face of a steep bank, a Transit Crane sets piles for an overpass on the R. N. Hewitt section. The crane swings 62-ft. long leads on its 65-ft. stick.**



The Delmag diesel hammer slams home steel bearing piles at a 3 on 1 batter. Note how the lightweight lead gets into the tight space between piles in this narrow footing.

most no stripping is done. (Sometimes, though, the catskinners carve out a bench on the steep slopes to give the drills some footing.)

John Forren, the drilling super, varied his spread to take on anything the rugged terrain threw at him. He has an Ingersoll-Rand Crawl-IR drill that climbs slopes the men can hardly make on their own. It also pitches in on secondary drilling when a shot leaves a few yards sticking above grade.

Then there's a big Robbins rotary drill that puts down a 7¾-in. diameter hole. It goes into action when the shovels crowd the heels of the powder gang, as is often the case when things click all along the line.

Pacesetter on the blast hole work is a Damco (Drilling and Mining Co.) rotary, which comes close to being a one-man gang. From his seat on the tail end of the machine, the operator guides the entire holing-out cycle. First he works the "travel" levers. The crawler-mounted rig lumbers over the rough ground to a grid stake. The operator plays the steering clutches to zero in on the hole. A touch of another lever plants three hydraulic outriggers firmly on the ground.

Now the drill swings into action. The 4½-in. diameter Varo bit spits dust and chips as it bites into the rock. Even in this choking cloud the rig breathes clean air. Air intakes, both on the drive engine and compressor, sport Donaldson dry-type filters. It's cheap insurance, Forren feels, against engine damage in this abrasive atmosphere.

The soft rock is no match for the carbide-tipped bit. Hole progress proves it. The drill sinks a 20-ft. hole through the layered sandstone and shales in two minutes flat. Forren shoots for a 25-ft. lift, just about the right height for loading with 2½-yd. shovels.

Vary Spacing

Hole spacing and explosives charge have varied as the powder crew pits its skill against the unpredictable rock. A tight 7x10-ft. grid with the Damco drill (up to 14x14-ft. spacing with the Robbins) opens the rock enough for scraper handling. At the same time, the fine breakage makes for bonus yardage from the shovels.

The powder monkeys load each hole with a high-velocity primer (a 2½-lb. cartridge of 60% duPont gel strung on a length of Primacord). Then they dump in about 100 pounds of Lion Brand ammonium nitrate prills. The men use prewetted prills—the fertilizer is thoroughly saturated with diesel oil before being sacked for the job. About 10 feet of dirt stemming tops each hole.

Forren watches his shots carefully as the cuts get deeper. The shale layers tend to slide like ice once they start to go. Overbreak from the slopes, with extra yardage to handle, is just what this job doesn't need. So Forren figures the burden on his toe holes

Climbing up a corkscrew haul road, an International 95 Payhauler comes after fill material for a crusher site on the Haynes Construction contract section. A 3½-yd. P & H shovel loads out shot rock.

(Left) **Powder Boss Simpson Grady gets set to drop the primer into a shot hole. Blaster's knot secures the Primacord to the cartridge of 60% gel.**

(Right) **Blasting prills, already saturated with diesel oil, chute into hole as powderman tamps the charge. Ten feet of dirt stemming top the hole.**

closely. He uses long delays (up to 75 milliseconds) against the bank to direct the force of the shot in towards the cut. Despite the ticklish shooting and fine breakage, powder ratio remains low. Job average is around one pound of prills per yard of rock.

A pair of Northwest 80-D's gets first crack at the shot rock. Johnson works them side-by-side to hold down delays caused by haulers waiting to get under a shovel. Despite the concentration of digging power at the face, traffic moves smoothly. Incoming drivers quickly size up the loading picture and head for the nearest open shovel.

The haul fleet includes 18 Euclid rear-dumps and six International 95 Payhaulers. The trucks move the rock to the nearest fill, if it's needed there. Most runs, though, are over a longer course to spoil areas off the right-of-way—sometimes as much as a 1-mile round trip. Johnson figures he'll waste as much rock as he uses, because the cuts outstrip the fills almost 2 to 1.

Even on the long hauls, output of the spread is impressive. The two shovels load out over 5,000 cubic yards a day. On the fills, the trucks dump the shot rock in spaced piles. Then a Cat D8 dozer spreads the material in 12-in. lifts. Oversize pieces that turn up occasionally in the fill pose no major problem. The contractor cuts them down to size fast with a 2-ton headache ball swung by a Lorain Moto-Crane. The rig is stationed at the toe of the fill so the operator can scan incoming material as it is spread. Compaction? No great effort required here, the super points out. Traffic of the rubber-tired haulers packs the rock and dirt mixture firmly. A Cat No. 12 motor grader blades the surface of the fill to shape the roadways as the subgrade is topped out.

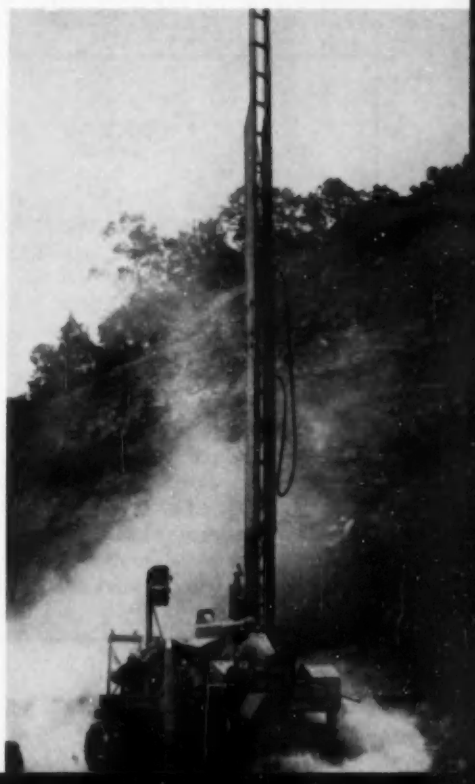
Trim Cuts

"What the blazes are scrapers doing in there?" That is the first thing you ask when you see the hustling spread at the bottom of a deep rock cut.

"They fill in neatly on some tough dirtmoving," Robinson explains. "Like trimming out the cuts and bringing the fills up to the blue-tops."

The scaper spread—three Cat DW21's and a Euclid TS-14—takes rock and broken sandstone in stride. With a push assist from a Cat D9 tractor, the pans take aboard a heap-

Drilling through sandstone and shales, this Damco rig sparkplugs the blasthole work on the V. N. Green contract. The machine is self-contained.



Bit sharpener, powered by an air motor, is always close at hand in its drill-side mount. Dry-type filters protect the air intakes on the engine and compressor.

ing 18-yd. payload in just over 45 seconds. Between pushes, the D9 gets in a few licks at the stubborn, rock strata with its rear-mounted ripper. Running a haul distance of about 900 feet one-way, the spread moves over 5,000 cubic yards a day.

No question that rock handling takes its toll in scraper wear and tear. The job's maintenance credo, though, is to prevent trouble rather than cure it. The grease monkeys go over the pans thoroughly whenever they pull a regular PM check. They handle most servicing, including major overhauls, in a well-equipped shop just off the right-of-way. As a result, maintenance costs on the scrapers have stayed in line with what would normally be expected.

Down the line from the V. N. Green section, another contractor has started work on a typical interchange bridge—a 180-ft. long span to carry I-77 over US 21. Here, too, the terrain is the greatest handicap. R. N. Hewitt Bldg. Co., Inc., has to drive 80 steel piles to support the bridge piers and abutments.

Dirt Mantle

Piles in this rock country? Yes, the soil at the overpass site—which crosses an old US 21 cut—is mostly loam with some sandstone chunks thrown in to add spice to the job.

Ten Years' Engineering in One

IT TOOK some jet-age engineering to get West Virginia's interstate program into action. Without the wonders of modern science—computers, electronic surveying, photogrammetry and the like—the digging work described in this article might still be in the talking stage.

When engineers set about planning the state's 300 miles of interstate routes, they found glaring voids in available map coverage. This included some of the wildest mountain area, naturally.

Faced with a back-breaking design load, the state road commission farmed out the interstate planning work to engineering consultants. "Get us maps and route locations—and get them fast," was the word.

Well, the experts knew the quick way to map this rugged country—from the air. But even an aerial photo has to be tied to some fixed ground points. So survey crews went out to put in a control net. They carried electronic "tapes"—radar-like devices that measure distance with the speed of light. (And work as well in rainy weather as they do on a clear day, too.) To save a good deal of mountain climbing, many of the crews helicoptered from one station to the next.

Draw Contours

With ground control fixed, planes took to the air to snap the photos. Then skilled technicians matched the pictures and drew up accurate contour maps. These provided all the data needed for the route location.

Later, refined maps were produced so job plans could be drawn

Face of a cut is a beehive of activity as 2½-yd. Northwest shovels load out the well-broken shot rock. Excavation on the Green section totals over 3,500,000 cubic yards—half of it rock.

(Right) **This is no place for a squeamish Cat-skinner. The dozer is scalling debris from a bench on the face of the cut.**

L. G. Dillman, super of the bridge building crew, brought in a mobile pile driving spread that took loam and rocks in stride. It also took some of the strain off the supply line that keeps this isolated job going. For the crew drives piles with a self-contained diesel hammer that easily takes to the hills—or anyplace else a crane can go.

The crane on this job—a Bucyrus-Erie 22-B Transit machine goes almost everywhere on a rugged 8x4 carrier. Dillman agrees that's a lot of truck for this size crane. At the same time he points out the smooth way the rig gets where it has to go, even over rough pioneer trails.

The 22-B handles 62-ft. long lightweight leads on a 65-ft. stick. A Delmag diesel hammer rides the leads. The crane works along through the entire cycle. It snakes in the 39-ft. long 10-in. I-beam piles, which are aligned for driving by a collar at the foot of the leads. The crew sinks piles at batters up to 4 on 1 using no additional bracing.

Drive to Refusal

The hammer slams home the piles at rates up to 10 a day. Specs call for a 45-ton bearing value. Dillman gets refusal on most piles. He measures this simply. He calls it quits when penetration rate reaches five blows per inch, with the hammer ram bouncing at least 5 feet. (The harder it is to drive a pile, the higher the ram of a diesel hammer bounces.)

The contractors on most other sections of I-77 active this season have just about knocked off the heavy grading work. Paving is on deck in at least one stretch. The Haynes Construction Co. has lined up a half-million dollars worth of new concrete paving equipment—mostly Blaw-Knox—for its stretch of highway near Kenna.

This contractor also set up a crushing plant deep in a valley off the main line. Perfect for gravity feed of material, the location created some tough site planning problems. Not the least of these was how to cart fill down the steep canyon wall from the right-of-way. A roller-coaster haul road and a fleet of burly haulers turned the trick. A P & H 1055 shovel on the grade loads loam into four International 95 Payhaulers. Then the trucks dive down the 30° grade to deliver the fill material to the plant site.

It may be years before motorists can breeze from the Gulf to the Great Lakes without a stoplight on the way. But when they do, a few of them on their way through West Virginia's mountains are bound to say, "What a lovely place to build a road." That rumbling in the background won't be thunder. It's the combined voices of I-77's construction stiffs echoing: "Yes, it's a great place to sightsee, but I wouldn't want to work there—again."

up. No long tedious arithmetic here. As the plotting machine traces the route map, terrain data is punched on a tape. Then the engineers feed the tape into a computer. In minutes, the electronic brain figures earthwork quantities for each station. Want cross-section diagrams? Simple. Just feed the same tape into a plotting machine.

So the contractors carving I-77 through the mountains north of Charleston have plans as modern as tomorrow to work from. And the motorists who will ride the smooth route soon can thank electronic sleight-of-hand that crammed ten years' engineering work into one.

A welder caused us to caucus

The note from an employee suggestion box read "How come a company like this hasn't got the U. S. Savings Bond Payroll Savings Plan". It was signed by a welder in the fabricating department.

Since we actually *do* have Payroll Savings this told us two things: (1) Probably more employees than we imagined wanted the advantage of buying U. S. Bonds automatically through Payroll Savings. (2) We had grown lax in bringing our Plan to their attention.

But what to do? The solution was simplicity itself.

We called in our State Savings Bonds Director. He provided all the promotional materials needed to arouse interest in U. S. Savings Bonds. Then he helped to conduct a personal canvass and place an application blank in everyone's hands.

The results were amazing. Employee participation shot up to a percentage that we could take pride in. There was no "hard selling", nor was work interrupted. Our people wanted the security U. S. Savings Bonds offer them.

Today there are more Payroll savers than ever before in peacetime. Your State Director will be happy to help you install a Payroll Savings Plan or build enrollment in one already existing. Look him up in the phone book or write: Savings Bonds Division, U. S. Treasury Dept., Washington, D. C.

EXCAVATING ENGINEER

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTIC DONATION, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

ONLY ALLIS-CHALMERS MOTOR SCRAPERS

give you

FULL POWER

... in every phase of the cycle

FULL POWER TRACTION
FULL POWER PENETRATION
FULL POWER EJECTION
FULL POWER STEERING

Steady production... even in mud

Fast, controlled loading

Quick, controlled loading

FULL POWER STEERING

Only Allis-Chalmers gives you this exclusive combination . . . a separate hydraulic system just for steering, exclusive multiplier links, and double-acting steering jacks.

These are the big reasons why Allis-Chalmers motor scrapers give you more sharp-turn, easy-maneuvering ability than *any ordinary units.*

A separate hydraulic steering system assures positive power for best performance during simultaneous steering and scraper operations. And Allis-Chalmers exclusive multiplier links give you a big edge over any other type of steering device. Double-acting jacks *push* and *pull* for faster turn-recoveries.

Watch the TS-360, for example, excel any comparable-sized unit in turn-ability on *your* job. Let your Allis-Chalmers dealer show you the "standing still" 180° pivot. You'll see how Allis-Chalmers *full-power steering* easily overcomes maximum turning resistance.

ALLIS-CHALMERS ALL-HYDRAULIC MOTOR SCRAPERS

Safe, positive turning

FULL POWER EJECTION

Only Allis-Chalmers all-hydraulic motor scrapers give you two-stage hydraulic ejection teamed up with the highest apron opening in the business.

The new hydraulic 340-hp TS-360 gives you a *full 10-ft. opening* from cutting edge to apron at full raise . . . higher than any other unit. With *double-barreled hydraulic power* the *360's* twin telescoping cylinders spread heaped loads without interference . . . without slowing down the cycle. Let your Allis-Chalmers dealer show you *any* Allis-Chalmers motor scraper working side by side with any other unit of *your choice.*

Bring your stopwatch, prove to yourself that Allis-Chalmers *full power ejection* is unequaled for fast, smooth spreading.

ALLIS-CHALMERS ALL-HYDRAULIC MOTOR SCRAPERS

Smooth, even spreading

10 to 30 yds heaped...155 to 3

FULL POWER PENETRATION

Only Allis-Chalmers all-hydraulic motor scrapers give you double-acting bowl jacks that penetrate for faster loading, controlled digging.

Exclusive hydraulic down pressure on the cutting edge permits quick penetration into the toughest-loading materials. Penetrating force like this—along with Allis-Chalmers' original low, wide bowl—gives you fast, heaped loads every pass. Operators go for this precision bowl control in a big way. You will too, when you see the results.

For definite proof, compare Allis-Chalmers performance with any other motor scrapers—in any cut . . . regardless of material.

ALLIS-CHALMERS ALL-HYDRAULIC MOTOR SCRAPERS

Fast, controlled loading

Quick, controlled loading

Safe, positive turning

...horsepower...

TS 160 TS 260 TS 360

FULL POWER TRACTION

KON-TORK differential provides every Allis-Chalmers motor scraper with full-time traction magic. You get all-weather production to help meet tight schedules.

KON-TORK differential works automatically. In the cut, on the haul or soft fill, it helps boost cycle time by automatically controlling the transfer of torque to each drive wheel... giving you full benefit of *maximum tractive effort all the time.* Another nice thing about KON-TORK differential is that it's simple. Its five moving parts require no adjustment.

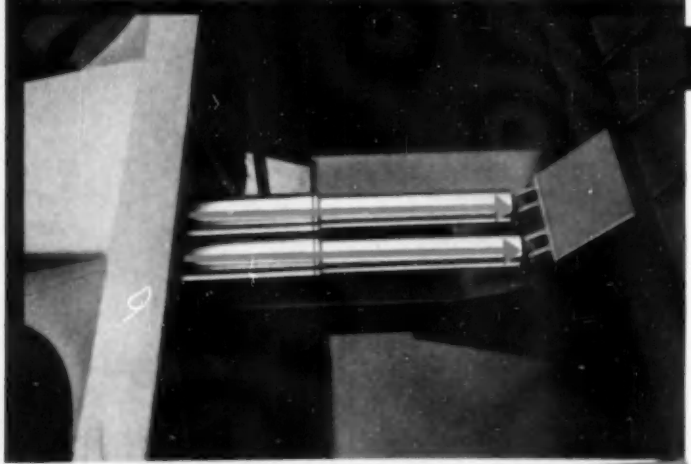
ALLIS-CHALMERS ALL-HYDRAULIC MOTOR SCRAPERS

Steady production...even in mud

155 to 340 horsepower.....

10 to 30 yards heaped.....

all hydraulic.....



Here's how full-power penetration puts enough force on the cutting edge to pivot this load clear of the ground. Only through the outstanding durability which is built into every Allis-Chalmers *seal, hose, jack, valve* and *pump* . . . can superior loading performance be realized day after day. The story is one of precision engineering and machining . . . quality materials . . . constant testing . . . and never-ending hydraulic research.

Here's how KON-TORK differential works for you every minute of the day. Whether you're loading, hauling, or spreading . . . you *always benefit* from the traction boost of KON-TORK differential. As footing conditions vary, tractive requirements are met automatically through KON-TORK differential's smooth transfer of power from wheel to wheel.

KON-TORK differential's simple, rugged design utilizes only five moving parts which require no adjustment. Try full-power traction on your job soon. You'll quickly see its big benefit—building up fast on the fill.

Here's how full-power ejection assures speedier fill work. Telescoping *hydraulic* rams provide *two-stage* ejection power. The first—and most powerful—stage forces the whole load forward. The second faster stage kicks out the remainder of the load clean as a whistle. It's no wonder Allis-Chalmers motor scrapers give you fast, even lifts every pass with *full-power ejection* . . . with *up to 2 ft. more apron lift* than any comparable-sized units.

Quick, controlled loading

You can't afford to pass up FULL POWER EARTH-MOVING PERFORMANCE

Pick a date for a demonstration now... with the all-hydraulic machine that fits your needs best!

TS 360

340-HP 22.3 TO 30 YD

TS 260

230-HP 13.5 TO 18 YD

TS 160

155-HP 7.5 TO 10 YD

Allis-Chalmers motor scrapers have proved their capabilities on thousands of jobs ranging from superhighways to simple, single-unit stripping jobs. You owe it to your investment and your future to appraise the industry's only *full-power* motor scraper line.

Only *performance* puts profit in your pocket . . . look beyond the paint when choosing your next modern earth mover. Your Allis-Chalmers dealer will be out to demonstrate on your job . . . can help finance your equipment . . . will back you up with service that satisfies.

ALLIS-CHALMERS CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

move ahead with ALLIS-CHALMERS
...power for a growing world

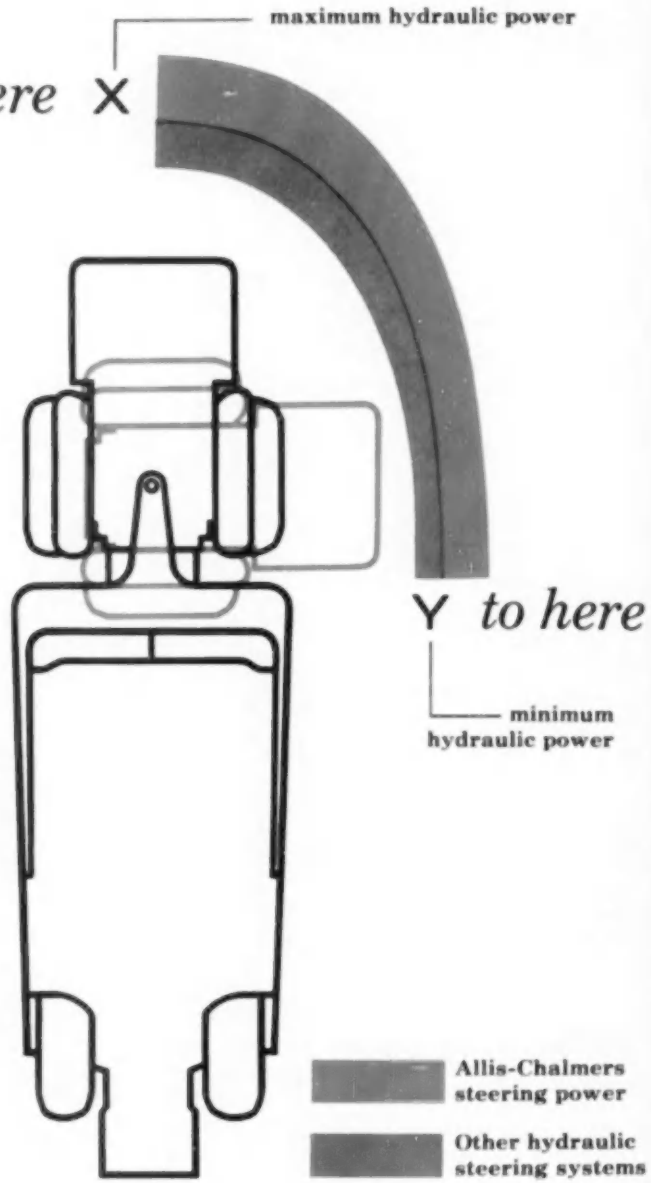
KON-TORK is an Allis-Chalmers trademark.

LITHO IN USA D&J-60

Only Allis-Chalmers all-hydraulic motor scrapers give you

FULL POWER STEERING

from here X



HERE'S HOW

1 **Fast, 180-degree, non-stop turning** in less than machine length with only one-sixth turn of the steering wheel.

2 **Faster recoveries** from full 90-degree turns than any other motor scrapers.

3 **Double-acting hydraulic response** to match any situation in every phase of the cycle.

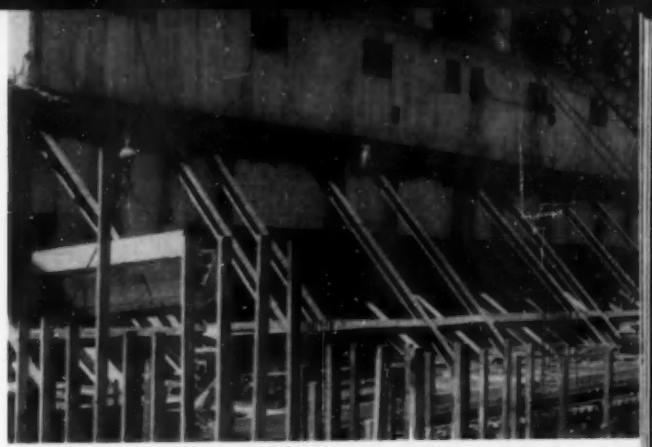
Only Allis-Chalmers motor scrapers can provide you with these exclusive advantages.

As illustrated in the graph, Allis-Chalmers hydraulics provide more turning power at point *Y*—*the low power point in any steering system*—than most other motor scrapers have at point *X, the point of maximum hydraulic turning effort.* The reasons: Allis-Chalmers motor scrapers provide independently powered hydraulic steering systems. And Allis-Chalmers advanced engineering has resulted in a hydraulic system which is the standard of the industry.

Smooth, even spreading

Drills Whip Foundation Problem

Major addition to Frisco's Fairmont hotel calls for placing of steel struts to support Tonga Room swimming pool while work is in progress. Noise rules out use of pile drivers.



Existing walls of hotel are safely shored with heavy steel struts. They were put in through holes cut in the walls of the old garage and hotel wing before demolition began.

by Floyd Suter Bixby

SAN FRANCISCO'S touchiest foundation job in years is under construction at the Fairmont hotel, high atop Nob Hill. While a garage and existing wing were torn out and replaced by a major hotel addition on the east side of the property, the world-famous Tonga Room swimming pool was held safely in place by steel struts, and 50 drilled foundation caissons were put in to support the new construction.

The steel struts which support the hotel's east side were put in through holes cut in the walls of the old garage and hotel wing. When a crane and breaking ball began the demolition job on these old structures, everything on the existing hotel was safely shored.

Haas & Haynie, San Francisco construction company doing the work, went outside their own organization to have the foundation job done. The Berkeley office of George F. Casey Co. was consulted. The firm is experienced in placing such foundation holes fast and safely. Some drilling would have to be done up close to that portion of the Fairmont remaining in place. In a few cases, too, drill rigs would have to work from lofty perches atop the old garage and wing, putting down the drill holes for soldier piles.

Casey moved in three truck-mounted 150-A rotary earthboring drills, and began the job of sinking 6-ft. diameter shafts with 47-ft. maximum depth. After being machine drilled, the shafts were hand belled, using clay spades and compressor power, to 14-ft. diameter. Loadbearing characteristics of the soil had been previously determined by Dames & Moore, foundation specialists.

Superintendent Terry Illum looks over the project from his office at the site.

(Above) **After the drillers sink shaft, the hoist at right takes over, removing dirt from hand-belling operation. Shafts are hand-belled to 14-ft. diameter.**

(Left) **Drill rigs are set up in close quarters. Shafts six feet in diameter for caissons are drilled to a depth of 47 feet.**

Completion of the new hotel wing is expected to add significant new space for large gatherings, such as conventions, to the hotel complex which overlooks the city by the Golden Gate.

Pipelining Spread Rolls on Rubber

Five joints of 36-in. pipe totalling 200 feet long are lowered-in by Maxi-mounted cranes. Rubber tires are easy on street surface.

Urban job calls for tight scheduling, careful excavation procedures and special rubber-mounted equipment as an eight-mile-long steel gas main, 36 inches in diameter, is laid in busy Chicago streets.

PIPELINE spreads commonly move across difficult terrain such as rock country, deserts, mountains and swamps. Occasionally, they also move on paved asphalt streets.

It doesn't follow, however, that the latter case means easy going for contractor crews. Progress on city pipelines must be fought for every foot of the right-of-way—through mazes of intersecting water, gas, sewer and electrical lines; under busy arterial streets; and often through thick traffic.

Also in the picture are city-dwellers in the immediate area—their right to live in a quiet and clean neighborhood must be preserved as far as possible. It all adds up to painstaking, demanding work for the pipeline contractor. These special problems are all present and are being solved on a pipeline job now nearing completion on Chicago's north side.

Big-Diameter Pipe

Contracting & Material Co., Evanston, Ill., is building a 36-in. diameter gas main for the Peoples Gas, Light & Coke Co. in Chicago. It runs between the utility's North Shore station at North Shore Avenue and a regulator station located eight miles south at Chicago Avenue and Sacramento Boulevard.

Skirting through Chicago Park District and Sanitary District lands and traversing residential streets, the pipeline follows a broken route east of and generally parallel to Kedzie Avenue.

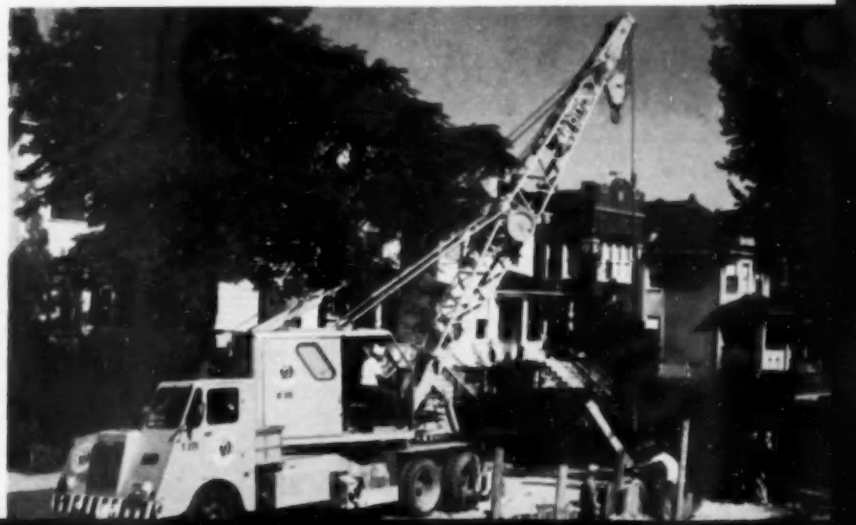
To hold down the noise level and minimize damage to streets, the pipeline contractor used rubber-tired cranes and excavators wherever possible. Crawler equipment was okayed for general use in parks and parkways.

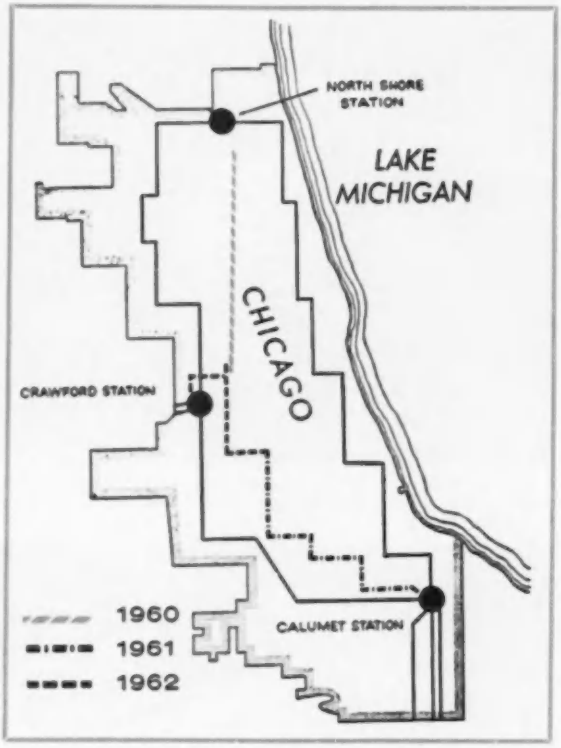
Lowering-in the big diameter pipe in street sections of the job were two Bucyrus-Erie 14-B cranes mounted on Maxi carriers propelled by the crane upper works.

Both 14-B's were delivered on a step-larger-than-standard mounting. The Maxi 64A carrier, with 12:00 x 20 tires and overall length of 18 feet 6 inches, provides a 20,000-lb. lower works. This is large enough to carry a crane the size of the 22-B. (The 14-B's standard rubber mounting is the Maxi 4215 unit.)

Equipped with a 25-ft. basic boom, the cranes have a lifting capacity of 15 tons at 12-ft. radius. Much of the time, the machines were working at a minimum boom angle of 25 degrees, where rated capacity is only 5,300 pounds. Such low boom angles were necessary when the cranes lifted a

Truck-mounted Bay City crane pulls timber shoring from trench after pipe is laid. The crane also unloads pipe, and assists on some heavy lifts of welded joints.





Color line shows route of the 1960 portion of the inter-station main of Peoples Gas. Remaining sections will be built within the next two years.

string of welded joints off the blocking and eased the long pipe into position over the trench. This meant at times each machine was lifting more than twice its rated load.

Jim McNulty, superintendent for Contracting & Material, said the cranes were easily handling the job planned for them. "At first when I saw the machines," he said, "they appeared so small they wouldn't lift anything. I was actually amazed to see the way they handled the lowering-in job."

The self-propelled rubber-tired mounting was chosen for the job because of its mobility, absence of abusive wear on the street surfaces and the stability provided by the 11-ft. overall width of the mounting.

40-Ft. Joints

Each joint of the gas main is 40 feet long. With a minimum wall thickness of ⅜-in., the pipe has a weight of some 150 pounds per lineal foot, before coating and wrapping. From two to five of these 40-ft. joints were welded into a string alongside the open trench before installation by teams of cranes. The trench itself averaged seven feet in depth in order to provide the buried pipe with a minimum of three feet of cover.

Most of the job was opened up by backhoes which dug a 66-in. wide trench in the city streets. However,

(Left) **Hough 2-yd. loader backfills sand.** ***(Right)*** **At intersection, 11-B Transit Machine clams trench material into truck.**

(Above) **At Throop Street station of Peoples Gas, pipe sections are readied for delivery to job. Pipe is coated with coal-tar enamel and spiral-wrapped with fiberglass and kraft paper.**

(Above) **From two to five joints of 40-ft. pipe are welded together on the job alongside the open trench.** *(Below)* **After welds are X-rayed and okayed, they are coated and wrapped.**

where the pipeline crossed open ground, the trenches were dug by wheel-type ditchers.

A wide-cut ditcher was used by Contracting & Material Co. in the area of Humboldt Park. The machine, a Cleveland 320 trencher powered by a Caterpillar D318 engine, opened up a 48-in. wide trench to a maximum depth of eight feet. Material brought up by the digging wheel was conveyed automatically by belt to waiting dump trucks. Twelve-yard Mack B-52 six-wheelers, used to haul material away, were loaded in about three minutes. The machine dug approximately six feet of trench to get a load.

In Humboldt Park, the contractor used snowdrift fences to protect passers-by from the dangers of the open trench. This was a rather unique feature of the job—workmen installing snow fences in the middle of the summer.

At work at Humboldt Park were two Caterpillar MD7 pipelayers and three No. 583 pipelayers. Lincoln 200 and 300-amp welders were used on the job exclusively.

Stored at Yard

Pipe for the project was fabricated in A. O. Smith's Houston (Tex.) plant and shipped by barge up the Mississippi and Illinois waterways to the Throop station of Peoples Gas Co. at 2428 S. Throop St. At the gas company property, the pipe was coated with coal-tar enamel, spiral-wrapped with fiberglass inner and outer wrap, and then stored awaiting delivery to the job. Pipe used for the line was 36-in. OD x ⅜-in. wall 5LX46.

The current 8-mile job is the northern most section of a $23 million inter-station main, some 29 miles long, which will be built over a three-year period. This new main will extend from the company's North Shore station to its Calumet station on the far south side.

The current portion, costing $6 million, involves 41,600 feet of 36-in. diameter pipe, various main connections, regulators and flow equipment.

The second phase of the interstation main project, which will take place in 1961, will be the southern portion from the Calumet station of Peoples Gas at 3200 E. 98th St., north to 55th Street and Winchester Avenue. This will involve 60,400 feet of line and cost $9 million.

The third phase scheduled for 1962

(Left) **Before construction of the gas main, this is how some Sanitary District property near Bryn Mawr Avenue looked.**

(Right) **After the main was laid, the right-of-way was smoothly backfilled and graded by Contracting & Material Co.**

is the center section linking the northern and southern portions. This involves 52,000 feet of pipe to cost $8½ million.

The term "interstation main" describes a pipeline whose purpose is to increase the capacity and flexibility of the gas company's present distribution system. The North Shore, Calumet and Crawford stations are the points of input of natural gas from Peoples Gas Co. transmission subsidiaries. The interstation main will interconnect and bisect the present-existing loop of 36 and 42-in. diameter medium pressure mains around the Chicago area.

Peoples Gas Co. is the parent of an integrated system of transmission companies, underground storage companies, and exploration and development firms. Its long distance pipeline subsidiaries supply gas not only to Peoples Gas, but also to other utilities in seven midwestern states.

Tough Specs

Peoples Gas has set up stringent specifications for the contractor to lessen the inconvenience of construction work to consumers along the route.

The present job began in June 1960, and will be completed by end of October. It is on a rush schedule that requires a six-day work week. The short length of the Chicago construction season is behind the need for speed. All streets opened up this year must be repaired and restored to original condition before the winter freeze-over, which interferes with pouring of concrete and laying of asphalt.

The contract made special provisions for clearing the right-of-way. The Evanston firm was required to preserve the trees within the right-of-way wherever possible. Because the pipeline passed through three parks and sanitary district land in the 1960 phase, the utility made sure that no signs of the pipeline's progress through these public areas would be left behind. In some instances, the

Moving down a boulevard, Cleveland 320 trencher powered by a Cat D318 engine cuts a 48-in. wide trench to an 8-ft. depth.

pipeline alignment was moved as much as twenty feet to avoid cutting down trees. Fifty trees were left standing on one stretch of sanitary district property because of such a move. The contractor also was required to hire landscapers to trim trees and to remove broken limbs as the pipeline spreads moved through tree-lined city streets.

Hauling and handling of the pipe joints was rigidly controlled by pipeline company inspectors. All pipe was stored at the utility's Throop Street station and hauled to the site by private contractors to eliminate unnecessary hazards. The pipe could not block intersections, sidewalks or driveways at any time. When delivered to the job, the pipe was generally unloaded immediately and strung out.

Foremen saw to it that the debris of excavation was quickly disposed of. The contractor hauled away all material excavated by backhoes and was not allowed to stockpile it on the streets. When the time came to backfill the trench, clean granular material was brought in, dumped and compacted. Mechanical sweepers were used to clean streets continuously.

To keep traffic moving and minimize hazards, advance crews opening up the street kept within 600 feet of the pipeline crews. At the rear guard was the backfill group which had to keep within 700 feet of the pipelaying crews.

(Right) **A crawler-mounted version of the 14-B crane is used in Humboldt Park to excavate around utility lines. Its ½-yd. Owen clam bucket dumps into a White Super Mustang six-wheeler truck.**

(Below) **Pipe dives under a principal arterial street through underground tunnel excavated with clay spades. Roof and sides are heavily shored with timbers and steel H-beam piles.**

Excavated material was hauled away in 12-yd. six-wheelers or long 24-yd. semi-trailer dumps. The dump trucks were loaded to partial capacity so that a high crown of dirt wouldn't slide off onto the streets.

The amount of trench left open at night was constantly kept to a minimum.

Pipe joints were welded together on the job under close supervision of gas company inspectors. Each pipe weld was given an X-ray inspection which determined immediately if there were any flaws in the welding process. The X-raying was done by Industrial X-ray Engineers of Chicago, and film was developed and read on the spot.

When the pipe weld got an okay from the testing engineers, the joint was coated and wrapped, and then the lowering-in process began. The trenches were heavily braced with jacks and timbers along the entire length. When the time for the pipe installation arrived, some of the jacks were removed. Then, the rubber-mounted cranes lifted the pipe above the trench and maneuvered it to fit under the trench jacks and any intersecting utility lines left in place. This involved some lateral travel.

While one end of the pipe was lowered into a trench, the far end was lifted high up in the air to enable the pipe to be slipped past obstructions.

That meant to make the lift, the far-end crane worked at almost a straight-up-and-down boom-angle.

As the pipeline curved around obstructions and underneath city streets, many odd-size shapes of pipe had to be formed. These included sidebends, where the pipe curved away from normal alignment; overbends, where the pipe went down through tunnels under the streets; and sags, where the pipe rose up from the bottom depth to its normal elevation.

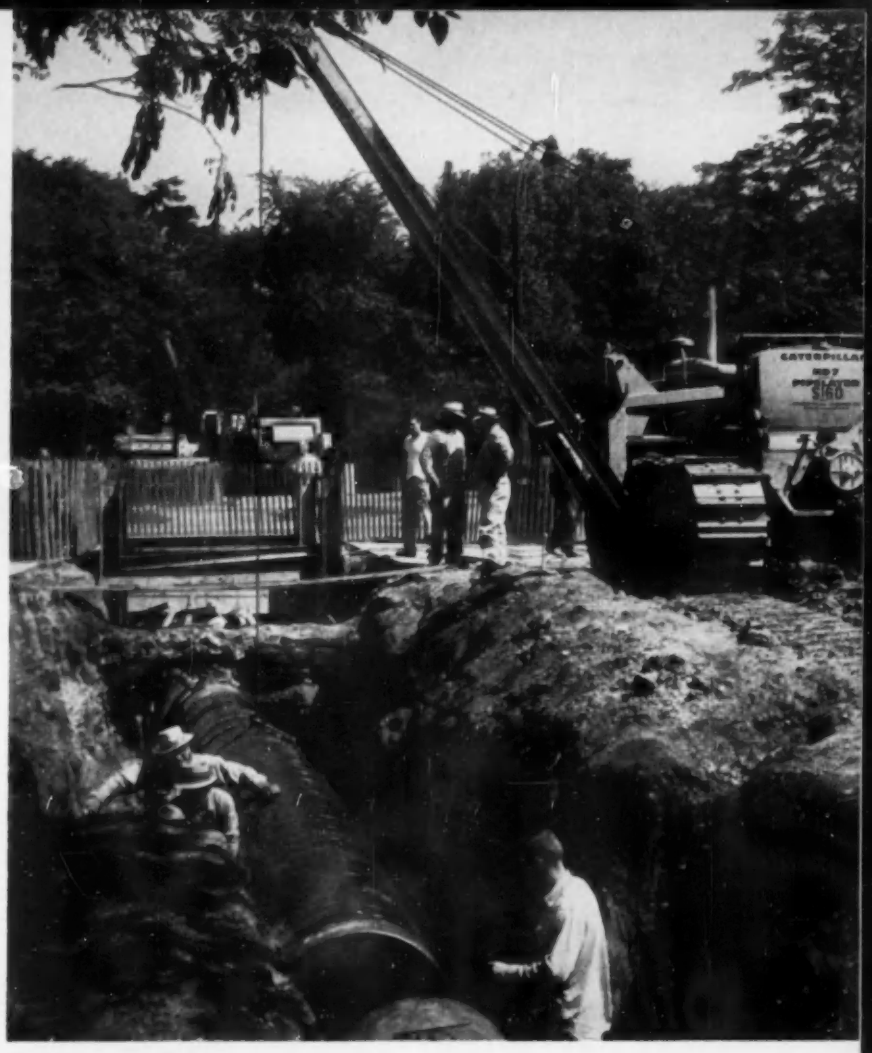
Pipelaying was a rigorous test for the small 14-B machines. Up to five joints of pipe weighing a total of 15 tons and running a maximum length of 200 feet were laid at one time. The cranes also unloaded pipe on the job from trucks; strung them out for the line-up crews; placed the pipe on blocks; attached line-up clamps; and finally lifted and swung the pipe into position.

Assisting the 14-B cranes occasionally was a Bay City truck-crane on a truck-mounting. The Bay City was also used to pull steel H-beam piling used for shoring up deep excavations and backfilling sand.

Another rubber-mounted crane on the job was a Schield-Bantam CR350, which had a 10-ton rating and a 25-ft. boom length similar to the 14-B's.

Before a pipe string was installed, a "nightcap" was temporarily placed on the end of the pipe, to keep water out and to eliminate the possibility of animals or inquisitive children entering the pipe.

The trenches were backfilled and tamped as soon as possible after the pipe was in place. Rubber-tired Hough 2-yd. Payloaders and clamshell excavators backfilled with sand. A concrete paving crew followed the pipelaying crews restoring streets, curbing and driveways that had been torn up. Asphalt topping followed later.



Caterpillar MD7 pipelayer shoves the pipe string through a tunnel under the street intersection and then positions it for welding. Snow fencing protects passers-by.

Short Tunnels

Principal arterial streets were crossed by underground tunnels, or by opening the trench for only a half-width of the street at a time. Tunnels generally were necessary when the excavating crews ran into intersecting storm sewers and utility lines on the main east-west streets. When the pipe dived down 20 feet or more under the street, a narrow tunnel was cut through heavy clay strata by crews using air spades. The tunnels were braced full length with heavy timbers on the roof and sides.

The pipeline passed through some of Chicago's most heavily populated neighborhoods where private residences lined both sides of the street solidly. The result was a maze of intersecting water, sanitary and storm sewer services. Crews disconnected and then reconnected the lines as promptly as possible to minimize the amount of interruption.

Numerous water mains were relocated along the route, either raised over or placed under the gas main pipe. In Albany Avenue, the contractor relocated a 6-in. diameter main for 1½ miles by moving it 15 feet from its original location.

In grassed areas, reseeding or resodding was required; in asphalt areas, paving crews followed up the cleanup crews, restoring the street, sidewalks and curbs to their original form—or in some cases better condition.

The pipeline job involved only one

serves more than a million customers of various classes within the city.

Working hours on the job were tailored to maintain good customer relations. Starting time was at 7 a.m. and the usual work day ran to 5:30 p.m., although at times the crews worked until 7:30 p.m.

Personnel

For the contractor, Jim McNulty is project superintendent. He is assisted by Marion Fitzgerald, Jake Tucker and Charlie Duke.

For the utility, operations were under the supervision of Paul Henehan, assisted by John Damm, engineers for Peoples Gas.

Contracting & Material has been in the construction business for 45 years and building pipelines for the last 20. The Evanston firm was established in 1913 by William P. Cagney, Sr. It is a family-owned organization. Four sons of the founder handle the business. They are William P., Jr., president; Richard D., who is in charge of all pipeline and underground work; Frank X., who manages the main office; and Donald P., in charge of purchasing.

Originally, Contracting & Material started business as a street and highway paving contractor. Later the company branched out, and it now does much heavy engineering construction. It was an important contractor on construction of the Illinois Tollway

(Left) **At underwater crossings, the pipe has a coating of gunite—a mixture of cement, sand and water applied under pneumatic pressure.** ***(Below)*** **Process is done in plastic covered enclosure.**

river crossing—the North Branch of the Chicago River. To cross the stream, the utility had to obtain permission of the Illinois Department of Public Waterways, the United States Army Corps of Engineers, the city of Chicago and the Chicago Sanitary District. Design of the crossing was specially planned to allow for future widening of the stream by the sanitary district. All underwater crossings involved the use of gunite-coated pipe.

In working out design specifications for the pipeline, the utility was guided by recommendations of the American Standard Association and the company's own experience in the field. The company is 107 years old and it where it put in place $30 million worth of work with its own forces or in joint venture with other contractors.

The firm first entered into the pipeline business in 1946 when it laid an 18-in. diameter line from Des Plaines to Volo, Ill., for Public Service Co. of Northern Illinois, now known as Northern Illinois Gas Co.

Since then it has laid over 1,000 miles of various sized lines for owners spread throughout mid-America. Its volume in this field approximates $12 million annually.

Cat and Allis-Chalmers pipelayers, assisted by a hoe, shove a gunite-coated section of pipe under the North Shore channel.

Modern Tale of Two Cities

Things are under control in Odessa . . . so much so that Sanitary Supt. Royce Meadows *(left)* can sit and have a talk with his boss, Utilities Director G. T. Morris.

Decatur, Ill., and Odessa, Tex., are two widely separated cities with similar populations. Here's how they solve their garbage-disposal problems with excavating equipment.

by Ray Day

MAN is a messy animal. His garbage rots in his back yard; then endangers community health when it collects on open dumps at the edge of town. It turns into firetraps, and becomes an odor nuisance. The unsightliness of what he does with his garbage dumps drops the very property values on which his security depends. Rats, flies, mosquitoes and vermin are rampant.

Not so with Decatur, Ill., and Odessa, Tex.

Odessa and Decatur exemplify what many a progressive community has done about its worst problem: garbage collection. These two cities are similar and yet dissimilar. But in the end, they've arrived at the same answer to their worst headache. Today they gather garbage while it's fresh, burn the combustibles and compact the rest to high density; then cover the debris with good dirt.

Decatur's program is upgrading the value of 52 acres of hilly, gully-ridden land. In Odessa, a multi-million-dollar butadiene-styrene plant now occupies part of the 640-acre plot where Texas garbage was dumped. Both cities have high health standards. Both are clean; orderly.

One of the chief factors in bringing about such a change has been improved technology in excavation and dirt handling. Today, thanks to modern equipment such as these two cities use, the sanitary landfill method of garbage disposal is possible. It's an effective, proved method of permanently disposing of all types of non-salvageable waste, including dry trash, incombustible rubbish, edible and non-edible garbage.

Men like Decatur's Carl Tucker and L. S. Simpson, and city officials such as Odessa's Utilities Director G. T. Morris, all pointed toward one significant set of advantages of a sanitary landfill. Boiled down, these are:

1. Health standards are improved by eliminating the flies, mosquitoes, rats, and disease-carrying vermin. In Odessa, for example, polio took a sudden drop after the method was

Odessa's newest machine is this Cat D6 dozer which shoves dumped waste material into a backhoe-excavated trench.

adopted, and before Salk vaccine came into use.

2. Fire and odor nuisances are eliminated.

3. Since modern garbage haulers carry all types of combined garbage and refuse, no sorting need be done by homeowners. That means lower costs.

4. Unburnable material causes no special operating difficulties.

5. Operations aren't particularly affected if waste input varies, day by day.

6. Disposal sites can be located within economical hauling distance of the centers of refuse production, without creating a nuisance.

7. Several disposal sites may be in use simultaneously. It's not necessary in Decatur or Odessa, though.

8. Wasteland, marsh or useless land can be reclaimed and converted into parks, recreation areas, or sold at a profit for industrial development.

9. Property values go up with the appearance of the completed fill.

10. The outlay for equipment is inexpensive. Often, this equipment can also be used for work other than garbage disposal.

11. Cost analyses show the method to be considerably less than that of the next most satisfactory method of incineration.

12. In many areas, a sanitary landfill can be operated to help stop soil erosion.

Private Collectors

The city of Decatur illustrates garbage collection by the private-enterprise system. To arrive at the solution it has today, Decatur passed through a long period of trial and error, open dumps, and a period of confusion when routes of private collectors overlapped. As late as 1943, Decatur had 13 open dumps which were rat infested, and so much overlap in collection routes that it wasn't infrequent for as many as six garbage trucks to make collections in one city block.

The 27 private owner-operators who, with their 38 vehicles make up Decatur's garbage-collection system, recognized that a far-reaching improvement would have to be made for private enterprise to serve Decatur's people well. In 1943, the Central Office of Garbage Haulers was organized. Purpose: to merge all the private haulers into a single organization, with routes zoned to prevent overlap. Some years later, Macon County Landfill, Inc., also was organized and the two outfits merged.

The organizations as such are nonprofit groups. Individual members have contributed to the organization for financing the salary of a fill-office attendant, and for purchasing such equipment as an Allis-Chalmers HD-11 loader and an Allis-Chalmers HD-9 dozer. They are also licensed, at $100 each, by the city of Decatur, and they pay a special truck fee levied by Macon County. Revenue for each truck-owner comes from a $2 monthly fee from the people served.

Royce Meadows looks down over two spots of caliche so hard the excavator just skimmed over the top, leaving plugs in place.

A ¾-yd. hoe reaches down to water table line to pick up a dipper full of caliche. Great trenches, 25 feet wide and 16 feet deep, are dug at a single time on the site.

Recognizing the necessity for getting rid of open dumps, the haulers covered all the old eyesores and dressed them off with two feet of dirt, after taking measures to kill off rats in the old dumps. A new site of 52 acres then was purchased. It was hill-and-gully land on the outskirts of Decatur.

This land is being filled by the "area" method of landfill. In this method, refuse is dumped first into the gullies and other low places; then gradually built up in ribbons of new material over the area. After the material is spread, burned and compacted to 60% density by tractors, 6 inches of cover material are placed and compacted over each ribbon of garbage. When the fill reaches its ultimate height, the site will be covered by two feet of dirt. Value of the 52-acre plot is expected to be much greater than it ever was before the job is finished.

Decatur's cooperative owners, through their organization, have purchased what they consider is a fine equipment solution to their problem. The Allis-Chalmers HD-9 crawler dozer has proved especially useful for building haul ramps and shoving dirt short distances. The HD-11 machine with its front-end loader is used mostly for making limited excavations, and for covering the rubbish. Covering goes much faster with the loader than with a dozer.

There have been some modifications of the area method, too. Especially in the early stages, it was necessary to dig some trenches. This leveled the ground to some extent, and made later disposal of material by the area method more efficient. The work was done by two rented LeTourneau-Westinghouse scrapers.

"We learned," Simpson said, "how important it is to plan our drainage carefully."

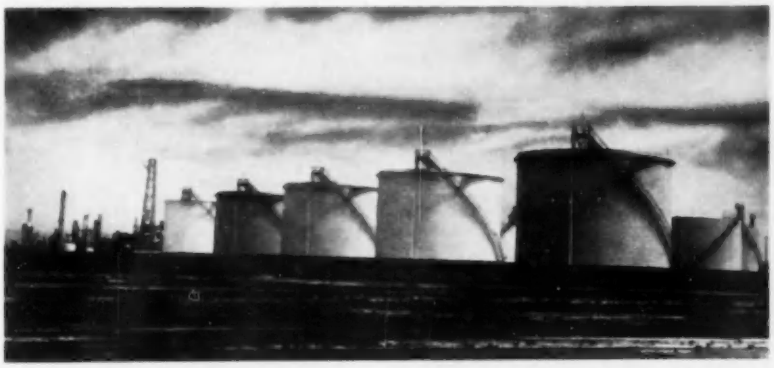
The headquarters-office setup has worked beautifully. One employee there can answer the phone, and handle from 30 to 90 outside truckloads a day over and above the input of regular organization haulers. As a matter of fact, this is the only public dump in Macon County.

Modern garbage-hauling units have really come into their own in Decatur. Truck-mounted Gar Wood, EzyPack and Loadpacker bodies carry 20 cubic yards a trip now, instead of the 7 yards loose which trucks formerly carried. What's more, the present machines have compaction rams which jam the material in until it weighs much more than it does loose. Burned and compacted on the fill, it weighs up to 600 pounds per cubic yard. One of Decatur's truckers who formerly used three trucks to service his route now handles the spread with one Loadpacker.

Odessa, sitting like a jewel on the endless flatland of the Permian Basin, also buries its garbage, but it uses a somewhat different system. Its 640-acre disposal site is perfectly flat. About 18 inches of topsoil overlay covers a caliche deposit which reaches down to the water table, about 20 feet below the surface.

This city, too, studied disposal methods carefully. Because it has a well-organized municipal government, the municipal system seemed best for Odessa.

The city has purchased a Bucyrus-Erie 22-B hoe for trench excavation,



This multi-million dollar butadiene-styrene plant was made possible partly because the chemical company was able to buy a portion of Odessa's garbage-filled land.

At Decatur, an HD-7 tractor pushes a ribbon of garbage together for its disposal by the "area" method. Tractor will compact the residue after burning is done.

Decatur (Ill.) private haulers Carl Tucker *(left)* and L. S. Simpson are part of a group of 27 owner-operators licensed by the city to haul to a common disposal site.

a new Caterpillar D6 for backfill and other dozer work, and a supply of 18 garbage hauling trucks. The city also owns two Dempster Dumpster hauling units, and has 60 spare boxes scattered through strategic places in town. These are especially convenient for taverns, stores and hospitals.

Odessa is realistic about financing its garbage-collection program. Right now, its annual budget for garbage collection alone is $415,000. About 75% of this amount comes from the city's general fund, so that average property owners pay nothing, other than routine taxes, as a direct garbage collection charge.

About 25% of the budget is recovered by Odessa, though, in direct collections. All commercial pickups are charged for on the basis of time studies, made from time to time, which show what this costs the city. Furr's Food Supermarket, for example, fills its Dempster Dumpster containers so often that it pays the city $180 a month to have its garbage hauled away. The Odessa hospital pays $167 a month; keeps two Dumpster containers filled so much they sometimes are emptied twice a day. Other charges range downward to as low as $2 per month for a small business establishment whose garbage production is minor.

One of the unique features about Odessa's operation is the proving-ground nature of its excavation. Many a Texas contractor has visited the 22-B hoe as, day after day, it dug long trenches the length of the prop-

(Left) **This is part of the huge fleet of trucking equipment it takes to service a community of 115,000.** *(Right)* **This HD-11G loader is doing two jobs simultaneously . . . creating a ditch for drainage, and stockpiling good dirt for backfill.**

erty, and as deep as it could reach. These great single trenches, 25 feet wide and about 16 feet deep, have been dug one at a time through the property, stacking the dirt on each side. When the site is finally filled many years from now, it will be about 15 feet higher in elevation than it was originally. The site was one of the few low spots around Odessa.

In four years of operation, the 22-B hoe has dug 10 full length trenches, and handled everything but solid calcareous lime rock without drilling or shooting ahead of the machine. If ledges of solid rock do occur, the 22-B simply digs as deep as it can go conveniently; then skims over the top until the solid formation drops again. Sides and bottom are cut square by the shovel operator as he moves down the line with the hoe. The 25-ft. wide section is excavated in two passes, half the ditch width at a time. The spoil banks are leveled by the D6 dozer, so trucks can back in and dump their loads. Odessa dumps its material down the trench sides in ribbons, too; then burns all the combustibles. Remaining waste is then leveled and compacted by the D6 before adding new material until the trench is filled to within two feet of the top.

Like Decatur, Odessa has farmed its metal salvage out to private interests. In both places, the salvage contractor hires and pays for his own men, and furnishes whatever equipment is necessary. The Odessa contractor uses an old crane with a magnet to reach down, after the material has been burned over, and remove salvageable metal.

In Odessa, too, everything is hauled away. City truck-carriers have forks on every truck, and each truck is manned by a driver and two ground men. Tree limbs, shrub trimmings, grass and all other such debris are removed without direct charge. These must be gathered together by the property owner, however, and preferably bundled for collection.

Municipal Setup

For Odessa, its municipal system has worked out very successfully. Paying for garbage hauling out of the general fund seems to work better here than a direct charge, which was tried for a time some years ago. People generally seem to prefer a direct charge when garbage is hauled by private haulers, but they protest mightily if the same charges are made by a city system. For that reason, Odessa follows the line of least resistance and hides its expense as a part of over-all general fund disbursements. Officials were quick to point out that it costs just as much for the city to hire its 60 employees, in the long run, as it does for Decatur's private operators to hire their help.

Odessa's operations are under the general supervision of City Manager W. E. Routh and Dr. J. T. Clark, mayor. Director of Utilities G. T. Morris and Sanitation Supt. Royce Meadows have direct charge of field work. Net result of their efforts, like those in Decatur, have made Odessa a beautiful, clean, healthy, well-kept place in which to live.

HOW THEY COMPARE

	DECATUR	ODESSA
Garbage collection method	Private	Municipal
Disposal method	Landfill (area)	Landfill (trench)
Av. cost per year per family	$24	$24* (indirect taxes)
Number of hauling trucks	38	18
Investment in municipal equipment	0	$30,000
Investment in private equipment	$42,500	0
Population in collection area	115,000	110,000
Av. tonnage hauled daily	375	300
Routine collections per week	2	2
Earthwork handled by	Dozer-loader	Hoe-dozer

* No direct charge made for service

TIMED TO PROVE FASTER HAULING

On the job described here, a 15-ton Koehring 100 Dumptor was matched against another leading rear-dump hauling unit. The Dumptor out hauled its competition by an amazing margin — actual time studies (see table) showed the Dumptor making almost twice as many round trips! Why the big difference? One reason was that the competitive hauler had to back down the grade — as one observer said, "You could smell the brakes burning."

Check out the 100 Dumptor in your own operation. Here's a 30,000 lb. payload machine with a big 10′ x 10′9″ body. Instantaneous or controlled dumping. No turn operation. Full speed in both directions. Hydraulic clutches for direction and speed range selection combine with torque converter drive and power-steering for maximum operating ease and speed. Your Koehring distributor has all the facts. Call him for a demonstration.

HAUL UNIT	HAUL TIME			DUMP TIME			RETURN TIME			AVERAGE TRIP
TYPICAL TRIPS	#1	#2	#3	#1	#2	#3	#1	#2	#3	
15 TON DUMPTOR	:48	:53	:49	:07	:06	:04	:37	:43	:48	1 min. 38 sec.
18 TON REAR DUMP HAULER	1:25	2:00	1:53	:14	:16	:17	1:12	1:09	1:14	3 min. 13 sec.

Pivoting seat
2-way controls, full visibility in both directions. That's the key to faster hauling with the Dumptor!

MODEL 100 | 15-TON DUMPTOR

Test of Dumptor vs. rear dump hauling unit on job covering 603 feet total one-way haul with 204 feet of total distance on a 20% grade.

MORE WORK CAPACITY
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Mexico's Largest Mill Expands Steel Capacity

A steel boom is going on south of the border. One plant will soon have a million-ton annual capacity.

by Mary Saint Albans

BLAST furnaces, down in Mexico, are *altos hornos*. And that is the name of Mexico's largest steel works, at Monclova in the state of Coahuila. The steel mill is located on Mexico's federal highway 75, about 142 miles southwest of Eagle Pass, Tex.

The Altos Hornos plant is undergoing a giant expansion program which will double its present 500,000-ton output.

Recently, too, the Altos Hornos firm bought La Consolidada, S. A., which had been Mexico's third largest steel producer. La Consolidada's present 180,000-ton production will also be doubled. So, the combined new output of both plants will probably up the company total of well over 1⅓ million tons.

Competing mills, likewise, are growing bigger. For example, Monterrey's Fundidora de Fierro y Acero is boosting its capacity up to 750,000 tons.

The big steel boom promises to bring the nation's total to 2½ million tons annually. That means Mexico will soon be on a par with highly industrialized Switzerland, which holds 16th place in the world's steel front.

This is certainly no mean feat for a nation whose output two decades ago was 114,000 tons.

Rich Resources

Happily the republic of Mexico possesses vast mineral resources. Estimated reserves include 300 million tons of coal; a good supply of fluorspar, dolomite, manganese and limestone; and, most important of all, 500 million tons of ore. One reliable consulting engineer sets the latter figures at 700 million tons.

Great quantities of iron ore are dug from Altos Hornos' recently opened mines in the state of Chihuahua, from the Iron Mountain of Durango and the Mamey Mine in the Pacific Coast state of Colima.

The greatest deposit of all at Las Truchas on the Guerrero-Michoacan border is marked for development in the near future. To provide power for that mine and a projected new steel mill, a dam is now under construction on the Balsas River that divides the two states. A West German firm which recently made a thorough technical appraisal of the property is reported to be readying machinery for shipment to a nearby port on the Pacific.

Through a substantial loan from the Export-Import Bank, much of the Altos Hornos machinery comes from the United States; also, a good portion is made right in Mexico, most of it from the company's own steel.

Ing. Harold Pape came down to Monclova from Armco Steel Corp. and stayed to become general manager.

Industrial achievements in this Aztec land have been the talk of both Americas for many years. Certainly none is more dramatic than Altos Hornos, a project which at its inception most Mexican businessmen regarded as foolhardy and even bizarre.

They had good reason for pessimism. Fighting for its existence in World War II, the United States had clamped rigid priorities on metals and machinery. Mexico's industries worked overtime to furnish materials, usually without the proper tools. As an example, sugar mills shipped considerable amounts of vitally needed alcohol but could not import parts from the U. S. for repairing machinery. Frantic foremen and engineers scoured junk yards, and dug into matted vegetation veiling grotesque ruins of Revolution-shattered refineries hunting bits and pieces of metal to weld into serviceable units.

These conditions animated a group of bankers and industrialists to consider seriously the feasibility of a new steel plant. They requested technical advice from the Armco Steel Corp. in Middletown, Ohio, and that prominent firm, seeing the possibilities, jumped into the venture with money and the loan of trained expert technical men. It also sent down one of

Bank of ore is drilled by a rotary rig in the La Perla iron mine in the rugged, desolate eastern Chihuahua state.

its ace engineers—Harold R. Pape.

Luckily, Pape possesses an iron determination to overcome difficulties, along with high energy and enthusiasm which magically transform the impossible into the possible. Other head executives who might well claim considerable credit for Altos Hornos' success give—unanimously—all credit to Engineer Pape.

The American's first step was to reverse the original plan of making rolled sheets and plates from imported ingots. He advised that the nation's own minerals be utilized thus avoiding the red tape of importing and an unending dollar outgo.

Problems Arise

It was a wise decision for the long pull, bu' one which increased immediate problems. More ponderous and complicated machinery had to be secured along with additional engineers and skilled workers. The new plan also augmented the immediate Midas-flow of money essential until production could start. To Pape all this was a minor matter.

His knowledgeable enthusiasm coupled with Armco's contribution (later bought out by the Mexican interests) induced Nacional Financiera (the Government institution which finances basic industries) to underwrite the project. Thus, Altos Hornos de Mexico, S. A. or AHMSA was organized with a capital of over $10 million.

Mill machinery was hard to come by. No new equipment could be secured. The only available solution was to buy junked material, and that demanded much time to locate and canny wangling. A blast furnace which had been abandoned for some 15 years was unearthed in Missouri; a decrepit Universal plate mill was picked up in Indiana; a race track structure whose columns served for the open plate department was dismantled and shipped from Kentucky. From here and there came broken parts of overhead cranes, construction shovels of ancient vintage, and generators which had been idle for years.

One freezing winter day back in 1943, Engineer Pape proudly watched an unloading job at Frontera, the railroad station three miles from Monclova, future site of the mill. To him, the material was not scrap but a steel plant rising majestically against a background of long limestone hills, just as you see it today. By his side was ex-President Abelardo Rodriguez, one of the Republic's most distinguished statesmen and industrialists.

Certainly the former president,

Big Altos Hornos plant is adding a new blooming mill, two open hearth furnaces and a 56-in. cold mill to its facilities.

Raw materials for steelmaking at Monclova come from scattered sources—ore at La Perla, coal at Palou, and limestone from a quarry a few miles east of the mill.

peering intently and incredulously at the unidentifiable pieces of rusty iron, saw no such vision. Suddenly he turned to grab the engineer's overcoat lapels.

"Mire, gringuito," he stormed, "if you're playing any dirty tricks on Mexico, you'll not leave this country for a long time! I'll see to that."

No less a problem was labor—common, skilled and technical. All engineers and workers worth their salt were already employed. Monclova's searing heat and bitter cold helped little. There were no hotels, no electric lights, no running water. Nothing to mitigate the discomforts of raw pioneering.

American engineers made ill by polluted water took to their beds; prospective workers enticed from the greener southern states refused to live in a desert, and took the next train home. But Pape and his assistants persevered.

The sick recovered. Water was purified. A boarding establishment was opened. A movie house shot up. Sheep and goat herders along with itinerant tramps came to look and were persuaded to work. Young graduating engineers joined up to learn from U. S. technicians. All were welded into an enthusiastic construction gang which gloried in its own resourcefulness.

When a 65-ton ladle crane and 80-ton girders arrived long before unloading equipment, somehow the crews got the stuff off of the cars.

Twenty months after official construction began in May 1944, the first blast furnace was blown in. A few months later the open hearth furnace was heated. The next day the plate mill began to produce.

From the quarry four miles east, men loaded limestone into battered trucks with power shovels. Sixty miles north, other workers dug coal by hand. Ore came from the rich mountain of iron in Durango (see Excavating Engineer, June 1957.) During the first 12 months, 44,000 tons of steel were produced.

Huge Site

The mill expanded. Every year came new machinery either to replace old or to become a part of a constantly enlarging program. Lupe No. 1 and Lupe No. 2, the high ovens were erected at the plant. Lupe No. 2 is the 20th in size in the world.

At the present time, a new blooming mill, two open-hearth furnaces and a 56-in. cold mill are in the process of installation. The plant and

(Left) **A 2½-yd. diesel shovel loads a Cat-Athey DW21-PR21 ore hauling unit.**

yards however cover so much ground that they are hardly noticed. This reporter spent a day at Altos Hornos, and the only sign of construction noted was a Bucyrus-Erie 38-B crane lifting a reheating oven.

A dozen shovels were working on the stockpiles. These included a new 38-B, two old 22-B's, and two Unit models. Cat tractors and an Allis-Chalmers HD-19 pushed material into place for loading.

In the extensive scrap yards, a magnet-equipped Industrial Brownhoist crane and two big Units loaded into gondolas. The company has 800 railroad cars along with four 400-hp General Electric locomotives, and four 1,000-hp Alco's.

The big sintering plant located between the giant hornos and the coke installations have Joy conveyor equipment equipped with Goodrich rubber. Beyond is a Dorr-Oliver water filtering system. Coal is stockpiled by a Sauerman Dragscraper installation.

Plentiful coal deposits are located at Palau sixty miles north of Monclova. Latest mechanized mining methods are used at the underground Palau mines.

Barber-Greene and Joy conveyors operate in the black subterranean corridors. Outside are a Bradford breaker, Allis-Chalmers low-head screens, Jeffery diaphragm jigs for coarse materials and ten Deister tables for fines.

Limestone comes from a quarry a few miles east of Altos Hornos. The pit is thoroughly modernized with a B-E 30-B shovel, two Unit shovels, and a Telsmith 18 x 32 jaw crusher.

Over in eastern Chihuahua three-quarters of an hour away by company plane, 193 miles by rail, the La Perla open-pit iron mine and processing plant operate around the clock. Output of the well laid out mine fills gondolas with 1,000 tons of ore daily, and the mine is equipped to triple this when Monclova gets into big production.

Ascending the steep slopes, this reporter finally reached the top to see a 40-R rotary blast hole drill at work.

The diesel-electric machine drills 9-in. diameter holes. Average hole depth is 36 feet and the drilling follows a 25-ft. spacing pattern. Footage drilled during an 8-hour shift is approximately 325 feet. About three

Ing. Carlos Villasenor *(left)*, assistant head of the steel firm's raw materials department, confers with Ing. Felipe Martinez, superintendent at La Perla iron mine.

***(Center)* Wagon speeds down haul road in the grim solitude of the highlands. *(Right)* Dump is made into A-C crusher.**

pounds of explosive break loose a ton of average ore.

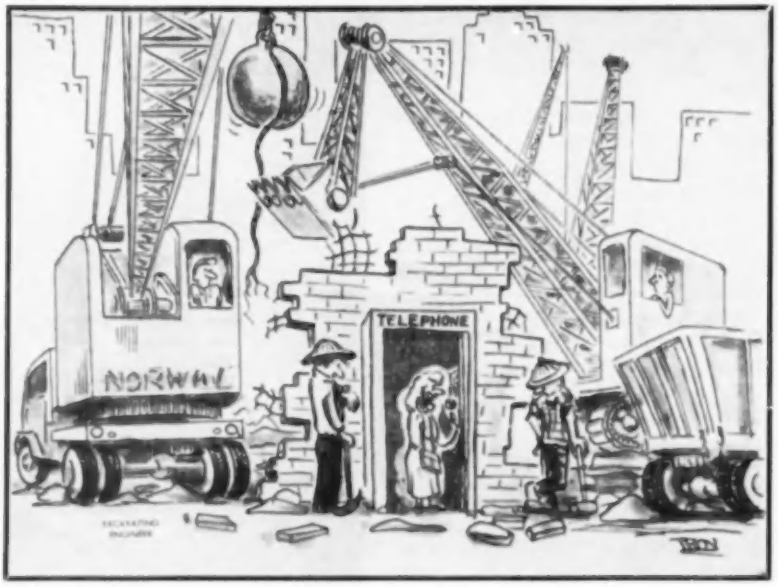
Nearby the drill, a 2½-yd. 54-B shovel emptied into one of six Caterpillar DW21-PR21 combinations, which do the hauling. On the bench just below a second shovel dumped into a wagon and Chicago Pneumatic drills bored into oversize chunks of ore.

Far below, the Cat wagons emptied into an Allis-Chalmers 36-55 primary crusher. The secondary crusher was an A-C 12-60. Eleven Jeffery belts, adding up to 2,300 feet, were equipped with Goodrich rubber. They carried the various sizes of ore which were broken down to minus 2-in.; minus 1-in.; plus ¼-in.; and minus ¼-in.

There was a Wemco heavy media plant, with four jigs for fines, and a Fairbanks-Morse power generating plant. The water system was copied after Altos Hornos' Dorr-Oliver system.

Near La Perla is the La Negra property, a reserve mine ready to go when the first is exhausted. Two helicopters are kept busy scouring near and distant terrains seeking more iron deposits. Altos Hornos is building not only for today and tomorrow, but for 50 years from now.

Fronting the La Perla mine is a green valley where modern homes with flowered lawns surround a small town. The community has a movie house, a handsome cooperative store where all is sold at cost, and two or three small shops.



The Carr Construction Co., of Mexico City and Monterrey, built the mine and the town as well as an access road 93 miles long to Camargo in Chihuahua. Construcciones Alpha, S. A. built a railroad 99 miles long to meet the National Railways of Mexico at El Oro in the state of Coahuila.

Commute by Plane

Ing. Felipe Martinez, the mine superintendent, flies back and forth to Camargo or Monclova as need arises. Ing. J. J. de la Fuente, head of the Raw Materials Department, and Ing. Carlos Villasenor, his assistant, visit the mine frequently.

AHMSA has several planes. The trip takes less time than a commuter's trek to New York City, and is certainly more comfortable.

From Monclova extends a 108-mile gas line to meet the line from Reynosa at Escobedo, Nuevo Leon. This solves the fuel problem. The company pays over 55 million pesos taxes every year, a sum which will increase as production increases.

Average pay for workers is far above usual rates in Mexico. Many laborers own modern houses as well as automobiles. Indeed, as a visitor approaches Altos Hornos the hundreds of cars reminds him of a U. S. industrial plant.

Plant manager is Ing. Ignacio Villasenor, who is the senior brother of Carlos Villasenor. Ing. Harold Pape is still the guiding genius and general manager.

Licenciado Tomas Bay, general director, presides in the Mexico City offices. He took the place of Ing. Pascual Gutierrez Roldan, now head of Petroleos Mexicanos. Also in these offices are Ing. Eugenio Castellanos, general sales manager; Senor Ernesto Contel, executive head of the sales department; and Senor Francisco Salinas, the mill representative.

Ore processed through La Perla plant is loaded by conveyor to rail cars for shipment 193 miles south to Monclova.

"OUR OUTPUT HAS INCREASED ABOUT 10%"

Mr. D. C. Penoyer, of Penoyer's Contracting Company, Clearfield, Pennsylvania, says of his Bucyrus-Erie dragline bucket, "We're pleased with this bucket. It has good digging characteristics; and we estimate our production has increased about 10%."

This 6-yd., type BEH, extra heavy duty bucket is stripping coal in the hills near Clearfield. It produces more because it was designed for big production. That 10% increase is the result of a high-wide arch, tapered basket, and correctly pitched teeth and lip which insure heaped loads and quick, clean dumps.

Its advanced engineering and Becoloy components enable it to take the day-in, day-out pounding and wear of everyday use. The bucket requires a minimum of maintenance.

This bucket was sold by the Beckwith Machinery Company, Pittsburgh, Clearfield, Erie, and Bradford, Pennsylvania. Your Bucyrus-Erie distributor will be glad to give you all the facts about Bucyrus-Erie dragline buckets.

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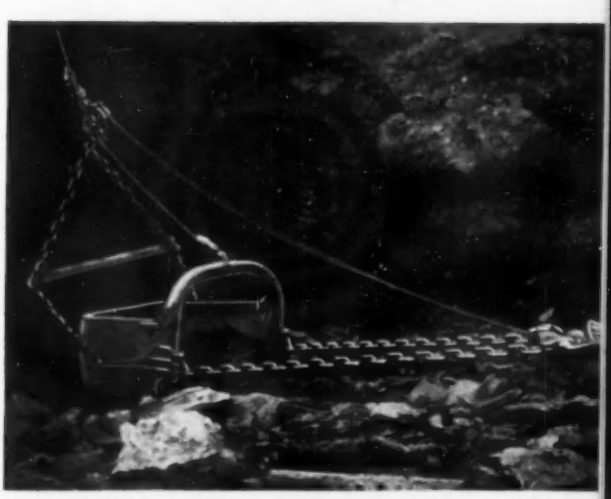
South Milwaukee, Wisconsin

Mr. D. C. Penoyer and son, Bob, pose with their production boosting Bucyrus-Erie bucket.



Penoyer's 6-yd. bucket digs in for load of shale and rock overburden.

BUCYRUS ERIE . . . *backed by the best in service*

ALL OVER THE U.S.A., CONTRACTORS

power-steer and power-shift

NO ATTACHMENT! NO AFTER-THOUGHT! NO "STOP-GAP"!

Exclusive, years'-proven combined Planet Power-steering and Hi-Lo power-shifting are designed-in, built-in, basic standard equipment of the new 230-hp International TD-25!

Simplified TD-25 design is the only planetary system engineered and located to give you the dual advantages of "live track" steering and on-the-go shifting!

"Live track" Planet Power-steering eliminates load-limiting "dead-track drag"—gives power to pull full loads on turns, as well as on straight-aways. On-the-go, Hi-Lo power-shifting does away with time-wasting "gear-shift lag"—lets you match power to load instantly for full-speed cycles!

No wonder the new TD-25 can outearn king-sized clutch-steered crawlers up to 50%—on push-loading; land-clearing; overburden removal; benching; "mass-production" dozing; ripping; other tough jobs!

New TD-25 seven-roller tracks are strength matched to the full effort of the new 230-hp diesel engine. The "25" is platformed on super-rugged double-box beam frames—and is smoothly carried on International's dual-protected Dura-Rollers, the track rollers that make 1,000-hr lube intervals practical!

Power-shift and power-steer the "25" with king-sized loads—around curves, upgrade, anywhere. Compare the advantages of getting this exclusive performance, and getting it from years'-proven standard equipment. Prove what's behind the "25's" rapid rise to nationwide contractor acceptance. Let your International Construction Equipment Distributor demonstrate!

Though "out-rated" 105-hp by a king-sized, clutch-steered competitor, this nimble TD-25 proves able to outwork "the big one"—side-casting and benching to build Pacific Northwest mountain logging roads!

International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

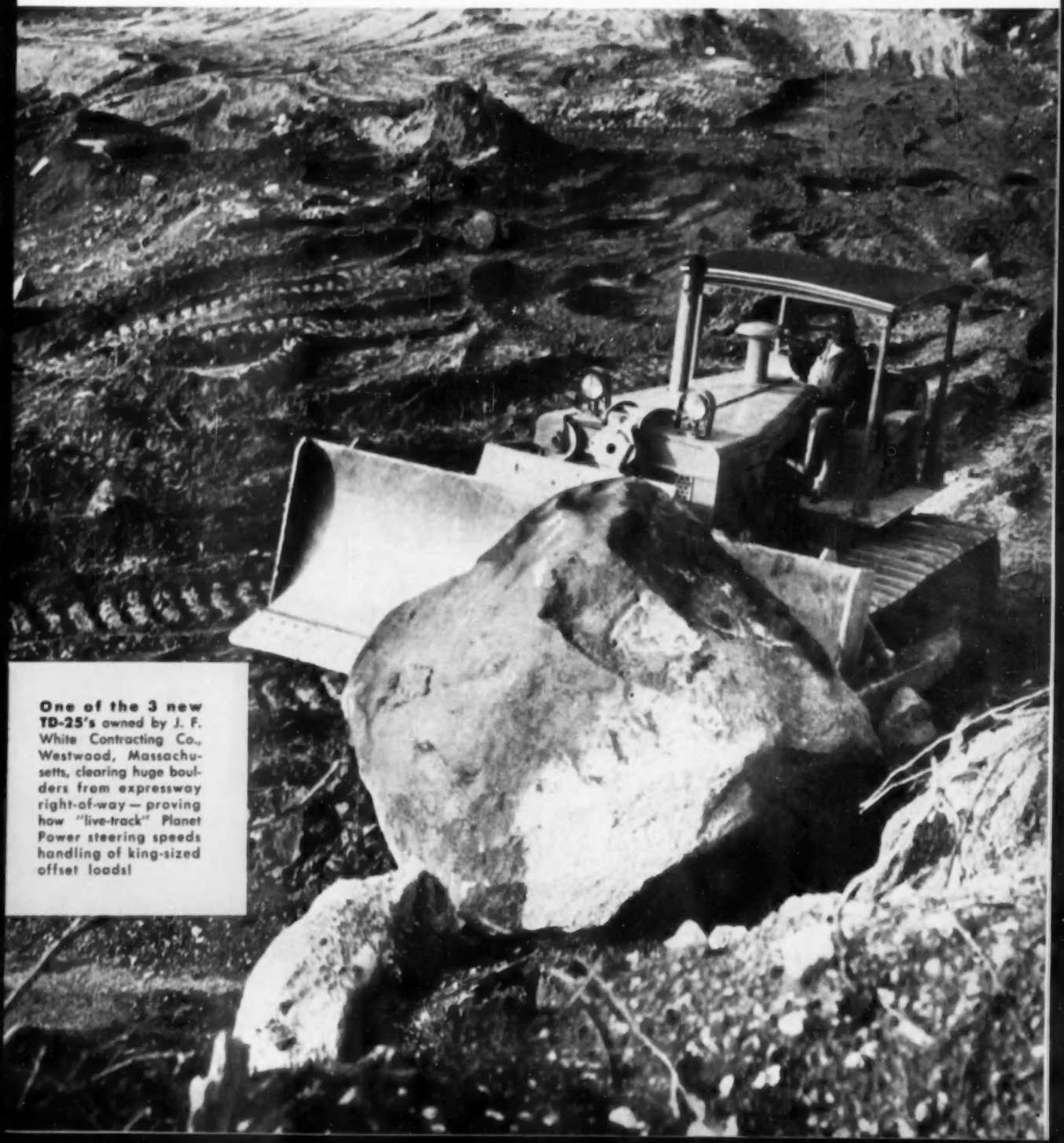
A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom-Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

Three new International TD-25's of contractor V. E. Posey's fleet team up to prepare homesites from a mountainside—near San Diego, California. Dual-valving of the "25's" direct-start DT-817 engine provides for peak turbocharging efficiency—to deliver full-rated performance, from sea level to timberline!

Cleaning the face of a Missouri strip mine behind a big dragline, this TD-25 pushes "tractor-sized" boulders aside with the greatest of ease. This "25" also builds dragline walkways and haul roads—and drastically cuts land-clearing costs for Peabody Coal Co.

For cycle-speeding push-loading, TD-25 power-shifting helps give "feather-touch" contact; maintains solid push-block contact on curves; gives gear-higher kick-outs than ordinary. The two "25's" tandem pushing the International 295 Payscraper®, and the third one ripping, belong to superhighway contractor Ed Bentley, Sylacauga, Alabama.

with TD-25 standard equipment!



One of the 3 new TD-25's owned by J. F. White Contracting Co., Westwood, Massachusetts, clearing huge boulders from expressway right-of-way — proving how "live-track" Planet Power steering speeds handling of king-sized offset loads!

Artist's drawing shows completed project. Reservoir has 96,000 acre-feet of flood control storage and drains 4,399 square miles above dam. The dam is part of a six-reservoir system and will include five public-use areas and a 20,000-acre game preserve.

Oologah Dam Forces Mass Relocations

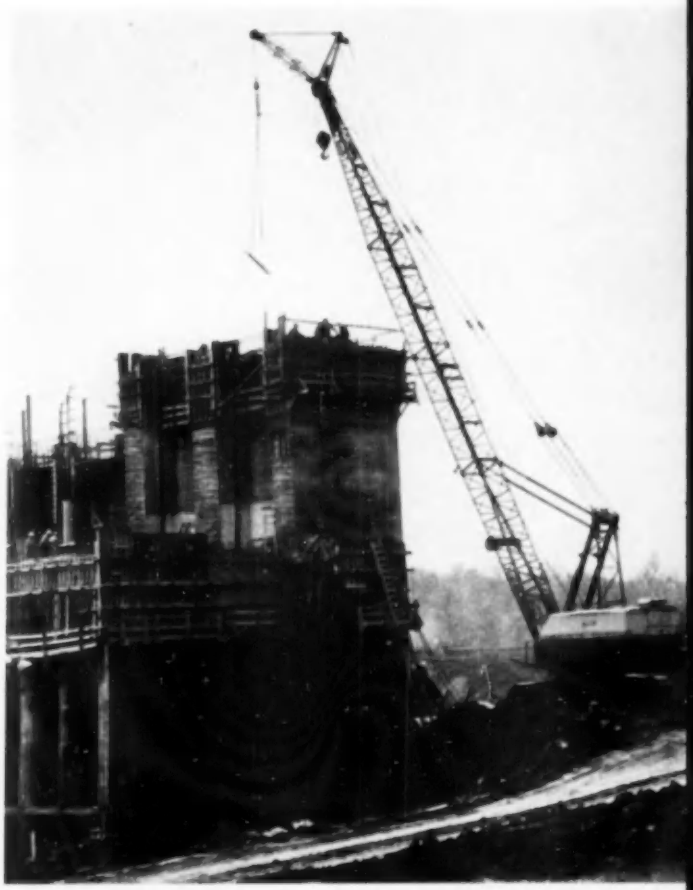
Five-year dam project involves 18 contractors working on earthfill dam and related structures, plus clearing 32-mile long reservoir.

by L. H. Houck

OOLOGAH dam and reservoir is a multi-purpose project with multiple problems. Unlike many dams built in arid and vast unimproved areas where few dislocations occur, Oologah, on the Verdigris River, is located just 27 miles northeast of Tulsa, Okla., in rich oil and cattle country crisscrossed with federal, state and county highways.

The $35 million plus job has put 18 contractors to work under the jurisdiction of the U. S. Army Engineers and is to be wrapped up by September 1962, with all contracts (except the dam) completed in 1961. Involved in relocations are some 50 miles of new highways, 112 miles of pipe lines, 134 miles of electrical lines, 111 miles of telephone lines and approximately 5 miles of railroad. Road construction includes erection of 11 bridges, numerous culverts, fencing, riprap and surfacing.

The relocations in Nowata county are being performed by seven Oklahoma contractors and one Arkansas contractor. They are Steinberg-Boyd Construction Co., Broken Arrow; A. K. McBride, Fort Smith, Ark.; Carl



As the massive concrete outlet works rose steadily upward, the crane's long reach proved invaluable. Contractor poured concrete all winter, using steam heat.

Lea Construction, Inc., Broken Arrow; A B C Construction Co., Tulsa; Imperial Paving Co., Oklahoma City; Brewer & McMichael, Inc., Holdenville; I. W. Woods Construction Co., Tulsa; and Noland Smith Construction Co., El Reno.

Quantities involved in these relocations include 2,393,000 cubic yards of excavation, 9,082 cubic yards of concrete, 1,099,000 pounds of reinforcing steel, 2,738,000 pounds of structural steel, 231,400 linear feet of right-of-way fence, and 117,400 cubic yards of riprap.

Cost of these relocations will be approximately $4,251,000. At the present time these relocations are approximately 77% complete with all relocations in the Nowata county area to be completed by March 1, 1961.

There are approximately 4,000 wells to be plugged in the reservoir and one-half have been contracted out to date in four different increments and a total of twelve contracts.

The plugging contractors are using both rotary rigs and cable tool rigs for pipe pulling, fishing and drilling operations. The wells are plugged by cementing in a packer above the top of the producing sand and squeezing the well by pumping cement under pressure thru the oil string down through the cement plug and into the sands below the packer. The wells are then filled with mud-laden fluid and lime to the surface where they are capped with cement.

The wells being plugged average about 500 feet in depth. The pump jacks, tanks, and surface piping accessory to the wells are being salvaged by the plugging contractors.

Southerly Flow

The Verdigris River rises in the Flint Hills of Chase county in Kansas; flows southeast from the vicinity of Madison, 103 miles to Neodasha, Kan., and there runs southerly 223 miles to its confluence with the Arkansas River about 5 miles northwest of Muskogee, Okla.

The river basin has a maximum width of 75 miles and a length of 175 miles within an 8,303 square mile area in Oklahoma. The channel averages 220 feet wide and 20 feet deep above the reservoir site and is about 400 feet wide and 35 feet deep in its lower reaches.

When completed, Oologah will consist of an earthfill dam 4,000 feet long, rising 129 feet above the river bed.

Oologah Dam Work Chart

Eighteen contractors are working in an area less than 30 miles square. Following are the contracts, the jobs and the amounts.

CONTRACTOR	JOB	AMOUNT
J. A. Jones Construction Co. Charlotte, N. C.	Construction of outlet works, spillway and completion of embankment	$5,055,859
M. J. Lee Construction Co. McAlester, Okla.	Spillway bridge for State 88	329,570
R. E. Nichols Construction Co. Tulsa, Okla.	Reservoir clearings	171,999
Board of County Commissioners Rogers County, Okla.	Relocation and alteration of Rogers county roads	730,032
Ace Construction Co. Omaha, Neb.	Relocation Road R-15, Winganon Crossing	1,395,982
J. A. Tobin Construction Co. Kansas City, Kan.	Relocation Rogers Road R-15, Winganon Crossing, Winganon Bridge	357,246
Brewer & McMichael, Inc. Holdenville, Okla.	Verdigris River Bridge, relocation of State 28	283,187
Steinberg-Boyd Construction Co. Broken Arrow, Okla.	Relocation of State 28, Lightning Creek Bridges and Lightning Creek roadway	674,983
Imperial Paving Co. Oklahoma City, Okla.	Relocation of U.S. 169, Talala Creek	351,518
A. K. McBride Fort Smith, Ark.	Alteration of U.S. 60	758,179
Carl Lea Construction Co. Broken Arrow, Okla.	Relocation State 28, Verdigris River	301,283
A. B. C. Construction Co. Tulsa, Okla.	Relocation U.S. 169, California Creek	606,222
J. C. Johnson Construction Co. Tulsa, Okla.	Relocation Highway 28, Big Creek	739,775

Cost Reimbursable Contracts

CONTRACTOR	JOB	AMOUNT
City of Nowata, Oklahoma	Relocation and alteration of city water supply	$ 245,800
Shell Pipe Line Corp.	Relocation, alteration and removal of pipelines and communication lines	1,299,495
Missouri Pacific Railroad	Alteration of existing railroad facilities	1,250,000
Texaco-Cities Service Pipe Line Co.	Relocation of 12-in. high pressure crude line	610,000
Service Pipeline Co.	Relocation of pipelines and facilities	653,530

Two 19-ft. diameter reinforced concrete gated conduits 340 feet long run through the embankment to form the outlet works. Future power generating facilities will be built in one conduit. An 84-in. reinforced concrete water supply line is installed parallel to the 19-ft. twin structures to supply local municipalities and industries.

First stage work on Oologah dam was done by Eugene Luhr Co., Columbia, Ill. Under an $885,000 contract it built the first stage embankment, outlet works and special cutoff trench excavation. These plus an access road and project buildings were completed in December 1957.

The principal contract of $5,055,859 for the construction of outlet works, spillway and embankment completion was awarded to the J. A. Jones Construction Co., Charlotte, N. C. The Jones contract calls for the actual construction of the concrete outlet works and spillway and the big earthfill embankment itself.

Quantities are impressive. Reinforced concrete structures requires 47,000 cubic yards of concrete and 4,700,000 pounds of reinforcing steel. Rock excavation, now largely completed, amounts to 50,000 cubic yards. There are 250,000 cubic yards of common excavation and 1,800,000 cubic yards of borrow are required for the embankment.

Required rock fill amounts to 36,000 cubic yards and 31,500 cubic yards of riprap are needed to protect the embankment.

The area consists of typical clay soil sprinkled with outcroppings of Oologah limestone underlain with shale. This situation contributed to construction problems. For instance, a limestone bed at the lowest elevation was found to be shot through with

Continued on page 52

How Payscraper® "automotive" operating ease *highballs your dirt-on-fill delivery*

You won't need stunt-car "jockeys" or muscle men to give you the dirt-on-fill bonus the 375-hp International Payscraper rigs can deliver! Almost all the danger, hard work, and rump-bumping of rubber-tired rig operation is engineered out of Payscraper models. And an exclusive combination of operating ease, safety, and comfort features is engineered in!

Push-button, finger-tip ease! Your operator simply pushes a button to direct-start the DT-817 Diesel and ready 375 high-torque hp to give a cycle-speeding Payscraper rim-pull of 60,000 lbs.; plus time-saving, "no-lag" control power!

Your operator pulls directly out of 90° turns—with 34-cu. yd. heap loads on either the 2-axle "295" or 3-axle "495." Ample power and traction team with the exclusive International tandem-pump, rack-and-pinion steering to give positive, right-angle turning with full power. This finger-tip controlled system leaves the "steering feel in the steering wheel," even at the top 33.5 mph speed.

For fast, positive dumping, the high Payscraper apron lift gives you a "barn-door-like" opening up to 94 inches! The positive-acting Payscraper ejector mechanism is powered by the International shock-absorbing, planet-type Cable Control Unit. One cable drum of this simple, fast acting unit actuates apron and ejector; the other drum positions the bowl to control spreading action. Shown, the 3-axle "495" fast-dumping on the fill!

He power-shifts the Payscraper, up or down almost like easing his car into automatic drive. The 4-speed, planetary-type, torque-converter transmission gives him load-speeding *automatic* direct-drive lock-ups in second, third and fourth gears!

Your operator power-steers the 150,000-lb. loaded Payscraper with automotive-like ease. He commands the exclusive "mind-reading" International rack-and-pinion, tandem-pump steering system—plus 3-degree forward spindle pitch that improves scraper balance and prevents "bucking bronco" nose-downs in high-speed turns!

He controls 34 cu. yd. loads on hills, fills, turns—anywhere—with positive-acting Payscraper air brakes. He power-controls all Payscraper dirt-handling actions, finger-tip easy, with the International PTO-driven constant running cable control unit!

And he rides in a foam-cushioned, 15-adjustment, bucket seat that gives positive, selective ride-control to match luxury car comfort.

See for yourself what it means, in highballing your dirt-on-fill delivery, to arm your operators with Payscraper advantages. Prove what happens when you give them the highest power-to-payload punch of the 34-cu. yd. rigs—along with Payscraper operating ease and safety. Choose the 2-axle "295," or 3-axle "495" and let your International Construction Equipment Distributor demonstrate!

Up or down power-shifting—effortless power-steering—fast power control of Payscraper dirt-handling—all help your operator give you fast "kick-outs" and get full pusher hp efficiency. The highest power-to-payload punch of all 34-cu. yd. scrapers helps highball dirt delivery. The planet-powered TD-25 and TD-24 are "pushing" for this fleet of "295's"—building superhighway!

Here's the big torque converter transmission—that helps Payscraper models turn 375 turbocharged hp into industry top-ping production! Besides providing smooth shifting and speeds for every need, this torque converter gives automatic lockup for direct, load-speeding mechanical drive in 2nd, 3rd, and 4th gears!

International® *Construction Equipment*

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Ill.
A COMPLETE POWER PACKAGE

Continued from page 49

solution channels making it unsuitable as an impervious base. Excavating an extensive cut-off trench in the pervious rock and filling it with impervious clay solved the problem.

Extra care is required in placing the compacted fill around conduits and bases of the outlet structure. Placing of embankment has begun on a small scale over the conduits in the outlet works but cannot proceed at full speed until the date set for diversion—January 1, 1961. Dumped rock fills and adjoining filter blankets are being placed with sufficient lag to prevent moisture entrapment in embankment, filter blanket or dumped rock fills to provide adequate "weep" time.

The rate of placement in the embankment closure section to El 634 is 250 days. Above this elevation to 687 feet, the placement rate is the same with 150 days before toppings begin. An additional 90 days will elapse subsequent to completion of the embankment closure section to El 634.5, prior to beginning of topping work.

This procedure (set forth in the specifications) is to give time for porewater pressures in embankment and foundation to dissipate. This is usually only required when there are clay soils in both foundations and fill and when the bottom embankment portion has to be constructed.

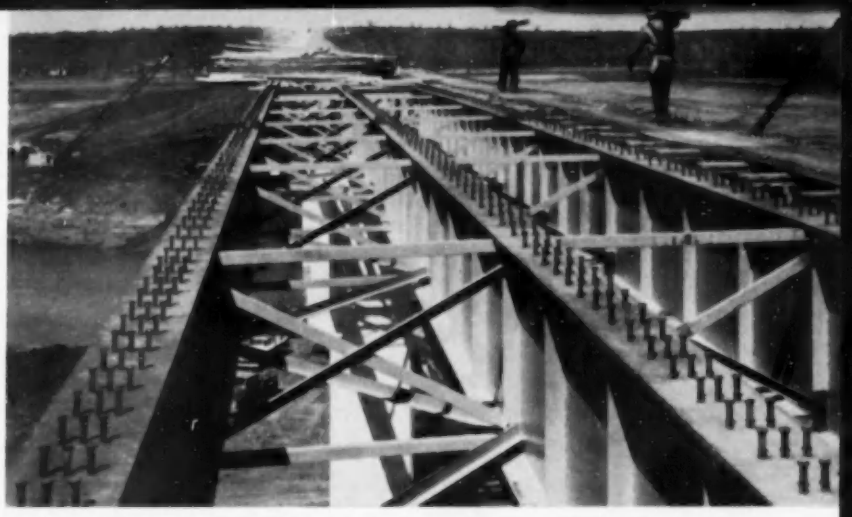
In the rock excavation, Jones drilled the Oologah shale wth a Gardner-Denver Air Trac drill and a Thor wagon drill supplied with air from two 600-cfm Chicago Pneumatic compressors.

Blast holes were loaded with American Cyanamid 60% dynamite and NCM (fertilizer), using electric delay caps from one to 10. Rock was loaded into 15-yd. Euclids by a Lima model 1250 shovel with a 3-yd. bucket.

Jones used an Allis-Chalmers motor grader for keeping up haul roads; three TS-18 Euclid scrapers; a TD-24 International dozer with pushblock for push-loading scrapers; Caterpillar D6, D7 and D8 dozers; and a Caterpillar 112 motor grader. Other equipment on the embankment were two 48-in. sheepsfoot rollers, two 60-in. sheepsfoot rollers, an air compressor, a Michigan front-end loader, a heavy-duty disc, a water tank truck and four pneumatic tampers.

Jones finished concrete structures last winter and started borrow excavation for the almost two million cubic yards required for the embankment.

For mixing concrete, Jones had a C. F. Johnson No. 286 batch plant with two 2-yd. Koehring mixers. Concrete was transported in Blaw-Knox 2-yd. buckets in a pair of Ford F-750 trucks. The buckets were handled by a Bucyrus-Erie 71-B crawler equipped with a 90-ft. boom and 20-



Workmen install girders on Winganon Bridge crossing over Verdigris River. In all, 11 new bridges were erected. Fifty miles of new highway are involved in relocation.

***(Below)* Two 10-ft. diameter concrete conduits 340 feet long form the outlet works. Power generating facilities will be built in one conduit. *(Right)* P&H 35-ton truck crane's ready mobility made it available on both ends of the job.**

ft. jib. The 71-B was also used in placing the 34-ton outlet work gates.

Another crane used in the concrete portion of the job was a P&H model 555, a 35-ton motor crane equipped with an 80-ft. boom and 30-ft. jib.

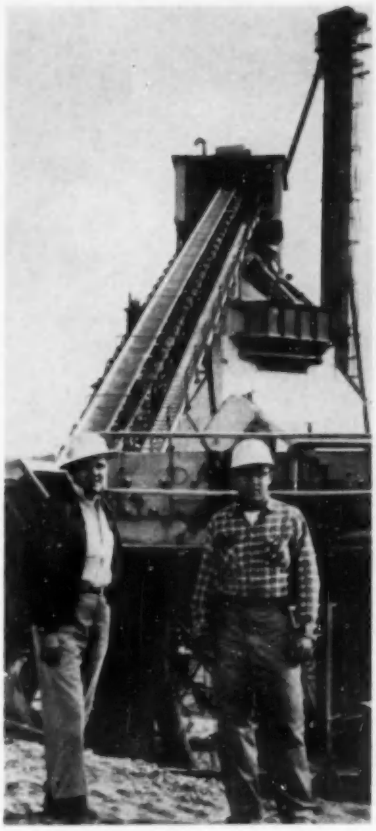
The batch plant was charged from stockpiles with a Michigan 175A pneumatic-tired loader.

Concrete in gate tower, conduits, stilling basin and spillway is 100% complete. Concrete in gaging station is 75% complete. The service bridge piers and abutments have not yet been started. First stage embankment is 100% complete (by previous contract). The main section of the embankment is presently 6% complete.

Oologah dam and reservoir will mean new growth and welfare for eastern Oklahoma.

It will provide 48,700 acre-feet of municipal water storage; a money-in-the-bank insurance policy for future industrial progress in the area. The project will mean 38,000 acre-feet of water storage for Tulsa, 500 for Collinsville and 2,500 for Claremore. Industries and municipalities are required to make appropriate payments toward the cost of storage. Eventually Oologah will be self-liquidating.

The M. J. Lee Construction Co., McAlester, Okla., was awarded the contract for a $329,570 spillway bridge for State Highway 88. The bridge, now almost complete, is a steel beam bridge supported by four intermediate concrete piers with a light weight concrete deck spanning 624 feet c.c. from abutment bearings. Equipment included a Bucyrus-Erie 15-B, an Insley crane and a Quick-Way truck crane. A Ross Porta-plant, which dismounts into units that can be highway driven, handled batching.



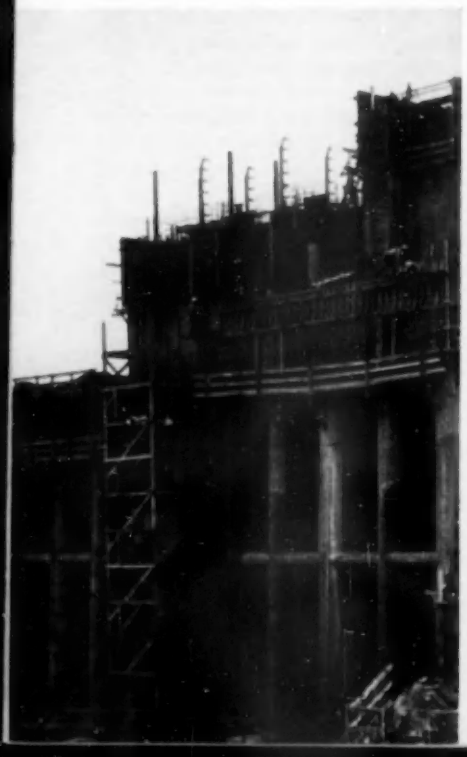
R. L. Welch, *(left)*, chief engineer, and W. E. Haynes, project manager for J. A. Jones, look things over in front of Johnson batch plant. *(Below)* John R. Soderberg, resident engineer for U. S. Army Corps of Engineers, supervises entire Oologah project.

Hydro-electric power generation was authorized by the River and Harbor Act of 1946 and is included in the second stage construction.

Representing the Tulsa District of the Corps of Engineers are Col. Howard W. Penney, district engineer, and John R. Soderberg, resident engineer.

Representing J. A. Jones Construction Co. was William E. Haynes, project manager, and R. L. Welch, chief engineer.

Aerial view of project shows: (1) Army Engineers office; (2) rock riprap placed on side of embankment; (3) J. A. Jones project office; and (4) concrete outlet works behind cofferdam.



Reservoir Covers Historical Area

OOLOGAH dam is rising in a historical spot in Oklahoma. Lt. Zebulon Pike viewed the fertile Verdigris Valley in 1810 on his famous exploratory trip along the Arkansas River. It is one of the oldest oil producing areas in Oklahoma, with many active secondary oil recovery projects, and is the location of the Nowata-Childers water flood recovery project, largest of its kind in the world.

Oologah dam site is located at river mile 90.2 on the Verdigris River approximately two miles southeast of the town of Oologah from which it takes its name, 10 miles northwest of Claremore. Claremore is the site of an ancient Indian battle ground, and now is noted for the Will Rogers Memorial. The dam site is 27 miles northeast of Tulsa, famed oil capital of the world.

The reservoir will inundate the birthplace of Will Rogers. The Rogers homestead lies 3.5 miles upstream from the dam site. The ranch of the humorist's father, Clem Rogers, took in hundreds of acres that will now become part of the reservoir.

Oologah is located in busy tourist area. New recreation facilities will attract thousands. Will Roger's homestead, a few miles up stream from dam, will be flooded over.

Triple Benefits

Oologah dam and reservoir were authorized by Congress for construction by the Corps of Engineers in the Flood Control Act of 1938, which permitted construction for flood control, navigation and recreation.

It will provide:

1. Flood Control. The Verdigris River has long needed controlling. It is known locally as a "mean" river with long-remembered periodic rampages. Most of the contractors on this project have been flooded out once, some twice, and are due to be flooded out again before the river is bridled. Oologah is a key asset in protecting the flood plain of the Arkansas and Mississippi rivers downstream from the Verdigris as well as 93,000 acres of downstream flood plain to its own mouth.

2. Navigation. Navigational features which will permit important movement of river freight by barge and river boat are tied in with Keystone dam on the Arkansas River and Eufaula dam on the Canadian River, as well as the upstream reservoirs now under construction. The present plan provides a navigation channel downstream from Tulsa (Catoosa) on the Verdigris and Arkansas rivers.

Oologah is a unit of a potential six reservoir system which has been authorized and will contribute to the proper functioning of the multiple-purpose Tenkiller Ferry dam on the Illinois River, the Fort Gibson dam, and Markham Ferry dam, which has been authorized but not yet constructed, on Grand (Neosho) River. The latter two are facilities of the Grand River Dam Authority, partly financed with federal funds.

The 6-unit system includes Hula reservoir in Oklahoma, now completed, Toronto reservoir in Kansas, under construction, and the Elk City (Table Mound) and Neodesha reservoirs, also in Kansas.

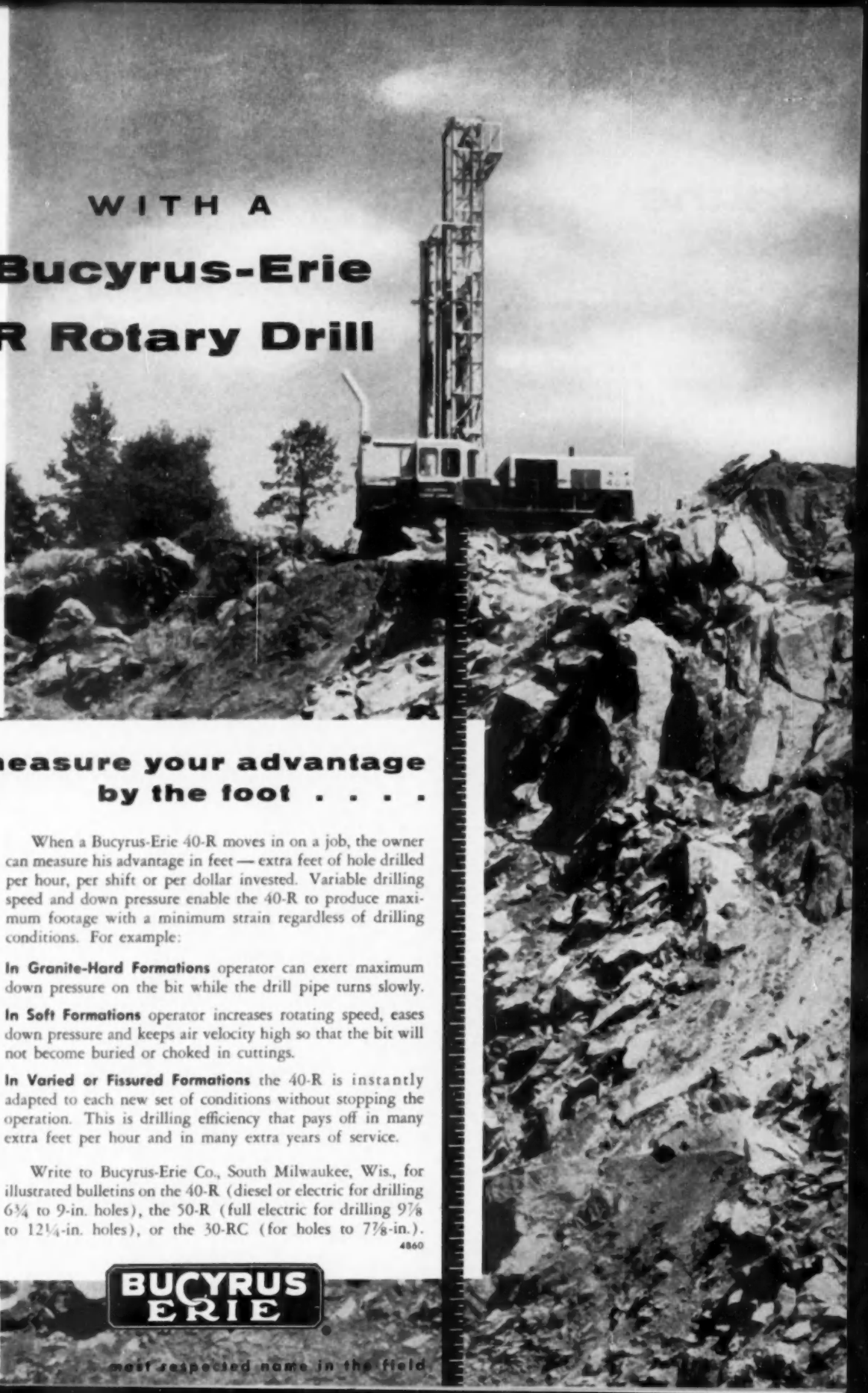
3. Recreation. To the millions of vacationers the dam and reservoir will provide recreational facilities that will attract national attention. Oologah will provide fishing, swimming, boating, picnicking, sight-seeing, historical exploration and water sports. There will be five public use areas and a 20,000-acre fishing and hunting preserve. Seven gravel surfaced access roads approximating three and one half miles containing five boat launching ramps have recently been completed in the lower reaches of the reservoir for the use of the general public.

Some 650 acres have been set aside for public use at the dam site. A park containing 780 acres will be developed on the Roger's homestead. Other public recreational areas include 490 acres on Spencer Creek Cove, 565 acres on Blue Island and 200 acres on Blue Creek Cove.

The government has offered Oklahoma's Wild Life Conservation Department a 25-year lease on land northward from Old Talala Crossing except the Spencer Creek Cove area. The government's 20,000 acres will be in the permanent lake in the ultimate plans for the reservoir.

WITH A

Bucyrus-Erie 40-R Rotary Drill



You measure your advantage by the foot . . . .

When a Bucyrus-Erie 40-R moves in on a job, the owner can measure his advantage in feet — extra feet of hole drilled per hour, per shift or per dollar invested. Variable drilling speed and down pressure enable the 40-R to produce maximum footage with a minimum strain regardless of drilling conditions. For example:

In Granite-Hard Formations operator can exert maximum down pressure on the bit while the drill pipe turns slowly.

In Soft Formations operator increases rotating speed, eases down pressure and keeps air velocity high so that the bit will not become buried or choked in cuttings.

In Varied or Fissured Formations the 40-R is instantly adapted to each new set of conditions without stopping the operation. This is drilling efficiency that pays off in many extra feet per hour and in many extra years of service.

Write to Bucyrus-Erie Co., South Milwaukee, Wis., for illustrated bulletins on the 40-R (diesel or electric for drilling 6¾ to 9-in. holes), the 50-R (full electric for drilling 9⅞ to 12¼-in. holes), or the 30-RC (for holes to 7⅞-in.).

4860

BUCYRUS ERIE

most respected name in the field

NOT in the Contract

A baby rabbit had been pestering its mother all day. Finally the exasperated parent replied, "You were pulled out of a magician's hat—now stop asking questions."

The lanky cowboy strode into the elegant ladies' shop and headed for the lingerie department. He approached the salesgirl and announced, "I'd like to buy a girdle, ma'am."

"Playtex?" she suggested.

"That's mighty kind of you, ma'am," the cowboy gallantly answered, "but not right now, I'm double parked."

He: "Why is it the most important men on campus always have the best-looking girls?"

She: "Why, you conceited thing!"

"How long do you plan to teach school?" the dean asked the pretty young thing as he handed her a teaching certificate.

She replied with a shy smile: "From here to maternity."

Salesman: "Is your mother home, sonny?"

Three-year-old: "No, but my sister is."

Salesman happily: "Would you please send her to the door?" The salesman waited impatiently.

Then after a long delay, the voice of the small child was heard. "I can't lift her out of the play pen."

Summoned to the business office, the salesman was told: "This expense account amazes us. How do you manage to spend $14 a day for food?"

"I manage," came the reply, "by skipping breakfast."

"Good show, Major! You got your big Cat."

Vicar (trying to patch separation): "Did your husband love you very much?"

Parishioner: "Love me? He wouldn't even leave me to go to work."

Despondent because his team was taking a shellacking again, the coach looked down the bench of substitutes and yelled:

"All right, Jones, go in there and get ferocious."

Jones jumped up elated.

"Sure thing, Coach. What's his number?"

A young man and a young woman reported to the circus for a tryout as lion tamer. The man went into the lion cage first. He was quite successful with all the animals except Duke, a young, fierce, heavily maned creature. Duke would not perform for him so he came out.

The young lady, clad in a bikini-like costume, then entered the cage. After a few cajoling phrases, Duke grovelled on the floor, crept meekly to her feet, patted her gently with his paw, ran his tongue out about a foot and kissed her on the chin.

The circus owner said to the young man, "Why can't you put on an act like that?"

Replied the young man, "I can, if you'll get those doggone lions out of there!"

Door-to-door salesman to housewife: "I'd like to show you a little item your neighbors said you couldn't afford!"

The geography teacher asked Bobby a question about the English Channel.

"I don't know," answered Bobby. "We don't get that channel on our TV set."

Two morons each had a horse, but they couldn't decide which belonged to whom. So they cut the mane off one to differentiate, but it soon grew back. Next they cut the tail off one, but that also grew back. Finally they measured them and found that the black one was four inches taller than the white.

HAROLD PATE

WITH POWER SHIFT TRANSMISSION...

"We proved the 977H Traxcavator doubles our production"

Strunk Bros. of Tiskilwa, Ill., put its new Caterpillar 977H to the test.

"We put the Series H machine against the earlier 977 . . . had them side by side excavating and loading 10-yard trucks," Superintendent Harold Pate reports. "Both machines had expert operators. The 977H loaded out five trucks in the same time the older machine got 2 or 2½ trucks. We proved the new 977H Traxcavator doubles our production."

Operator Wilbur Crank, who loaded 11 to 12 cu. yd. of clay and loam in the trucks in 60 seconds with the new unit, explains why.

"It's easier to operate. It's got more power. It's faster and handles well in mud. But most important, it's got that power shift transmission. That's the biggest part of the faster cycles. I can shift down instantly—and I mean *instantly*—to the speed I need. A flick of the wrist and I'm in second for moving. Another flick and I'm in reverse."

The 977H is a machine with more of everything. Horsepower of its turbocharged engine is up 50%—to 150 HP at the flywheel. Hydraulic lifting power is up 41% because of Caterpillar's *live action* hydraulics. That means faster lifting speed and greater lifting capacity without robbing power from the tracks.

Bucket capacity is up 11%—to 2½ cu. yd.—and there's a stronger linkage to handle the heavier loads. And there's a larger, stronger, lifetime lubricated undercarriage to stand up under the roughest conditions. It never needs servicing until rebuilding.

You may be missing a lot—in profits and production—if you aren't using one of the new Series H Traxcavators. See for yourself. Your Caterpillar Dealer will demonstrate one of the new machines side by side with the machine you are now using on your present job. And watch the difference!

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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TRAXCAVATORS ARE MAKING OTHER LOADERS OBSOLETE

NEWS FROM THE FIELD

World's Longest Bridge-Tunnel

The Chesapeake Bay Bridge and Tunnel District has completed the underwriting of a $200 million revenue bond issue to finance the bridge and tunnel crossing which will run 17½ miles across the mouth of the Chesapeake Bay near Norfolk, Va. Construction of the big crossing, which will replace ferryboats now operating there, is expected to be completed in approximately three years.

The project, the world's longest bridge-tunnel, was designed by the engineering concern of Sverdrup & Parcel of St. Louis, Mo. Wilbur Smith & Associates, New Haven, Conn., prepared the traffic forecasts.

Two tunnels, two steel bridges, a causeway and 11.6 miles of precast, prestressed concrete trestle will link Cape Charles, Va., with Chesapeake Beach near Norfolk. The construction cost is expected to be $139 million. This project will pave the way for a new coastal highway which will provide the most direct route between New England and Florida.

A driver leaving Norfolk for the eastern shore will first go out over the bay on a trestle. This will end on an artificial island where the crossing road will descend into a tunnel under Thimble Shoal Channel. The motorist will emerge at another artificial island at the end of the Thimble Shoal Tunnel and continue via a second trestle to the Baltimore Channel where, in like fashion, the crossing will become a tunnel.

Upon emerging on the artificial island at the end of the Baltimore Channel tunnel, the motorist will cross a trestle toward Fisherman Island. Near the west side of the island a bridge will span the North Channel. A causeway will carry the crossing over Fisherman Island. On the east side, a bridge will span Fisherman Inlet. The crossing will terminate in approach roads at Wise Point on Cape Charles.

A novel feature of the project will be a restaurant and one or more fishing piers to be erected on the artificial islands.

The ferryboat ride across the bay takes about 95 minutes and the new facility will cut this time to about 35 minutes.

Construction contracts for the tunnels and trestle have been signed with a joint venture consisting of Merritt-Chapman & Scott Corp., Raymond International, Tidewater Construction Co., and Peter Kiewit Sons' Co. Contractor for the two bridge superstructures is the American Bridge division of United States Steel Corp.

Dirt Stockpiling Saves California Money

California drivers smile these days instead of muttering murderously when a stiff breeze blows loose dirt across their cars from piles along the roadside. Those dirt piles are saving them piles of tax dollars.

In a unique move to stretch the state's construction funds, California highway officials have devised a way to obtain free fill material. Under the plan, the state makes rights-of-way along routes of future highways avail-

Continued on page 60

ONE TON FOR 6 CENTS...Total Digging and Hauling Cost with a Sauerman

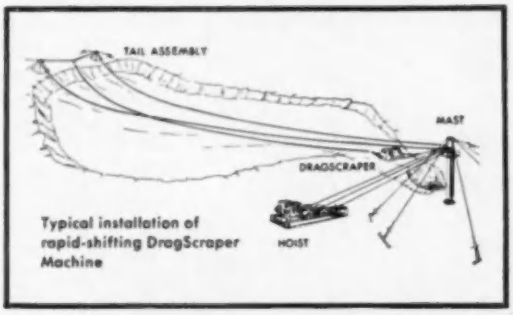
Dig and haul from your high bank, deep pit or underwater deposit direct to plant hopper or stockpile for 6 cents per ton. This cost is based on current job figures for Sauerman DragScrapers operating over average depth and haul distances.

The reason: one man and one machine handle the entire job. You save money three ways over multiple machine methods. Your power costs are much lower. A single operator replaces two or more on your payroll. Your maintenance costs are much lower because only the DragScraper Bucket and cable contact the material handled.

If you are hauling over distances up to 800 ft. or digging under water at depths to 100 ft.—the Sauerman DragScraper Machine is the most economical means you can use.

You can get DragScraper Machines in sizes from ⅛ to 15 yds. to match your tonnage requirements. Write or call about the physical dimensions of your deposit. We'll recommend the proper machine. For general information and detailed data on specific installations request Catalogs A and SG-1.

Plant Operators Are Saving On Power, Labor And Maintenance With Sauerman DragScraper Machines



Typical installation of rapid-shifting DragScraper Machine

DragScraper Bucket deposits load of sand onto grizzly hopper.

SAUERMAN BROS., INC.

622 So. 28th Ave., Bellwood, Illinois
Linden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent DragScrapers • Slackline and Tautline Cableways • Durolite Blocks

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THE GIANT OF THEM ALL

The following five combined features make OWEN the big giant performer . . . for any type of clamshell work . . . for any model or make of crane.

1. Block and Tackle Type Reeving
2. One-Piece Head Construction
3. Riveted Bowl Assembly
4. Single Main Shaft
5. Recessed Lips

Added to these construction features are more than fifty years experience in the manufacturing of clamshells . . . and nothing else! For any job that requires a clamshell, there is an Owen to fill the bill . . . backed by proven construction design and over one-half century of experience.

Put the Giant on your crane — OWEN — and know the work will be done faster, better and more economically.

Write today for any specific or additional information

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BRANCHES: New York • Philadelphia • Chicago
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News . . .

Continued from page 58

able to contractors with excess excavation dirt.

The dirt collecting plan was begun three years ago in the Los Angeles area. A half million yards of free fill material were dumped on designated sites last year, saving California around $1 million. Contractors have unloaded a million yards of excavated material in the first half of this year and the savings will be even more.

The money-saving works for the contractor, too, who needs to make only short hauls with his excess dirt. The California highway department has so many freeway sites on the planning boards that there's usually one within five miles of any construction job.

Ralph E. Docker, senior state highway engineer in Los Angeles, says that freeway contractors always exercised their option to dump excess fill on other nearby highway jobs. Under this new plan, other contractors and public agencies have been giving the state free dirt. Among the contributors last year were the Los Angeles County Flood Control District and the U. S. Army Corps of Engineers.

B-E Elects Executive Vice-President

Bucyrus-Erie Co., South Milwaukee, Wis., has announced the election of Eugene P. Berg, 47, as executive vice-president.

Berg previously was general mana-

ger of all Chicago operations of the Link-Belt Co., manufacturer of conveyor equipment, and had been with that firm since 1937. As general man-

ager, he was responsible for sales, manufacturing, finance, engineering, industrial relations and all phases of management.

A 1937 engineering graduate of Purdue University, Berg later received a masters degree in business administration from the University of Chicago.

New Dredge Readied for Shipment to Brazil

A 24-in. hydraulic pipeline cutterhead dredge incorporating the latest refinements in heavy-duty hydraulic dredge design has been completed by Ellicott Machine Corp., Baltimore, Md.

The *Parana* was built for the republic of Brazil under a $5,500,000 contract for dredging machinery concluded by Ellicott last year with Brazil's National Bank for Economic Development, acting for the federal Ministry of Transport and Public Works.

The total contract includes a duplicate of the dredge just completed, on which the installation of dredging machinery has begun at the firm's docks, plus renewal equipment for modernizing one existing hydraulic pipeline unit and two sea-going hopper dredges. This was one of the largest dredge equipment contracts ever negotiated with a Latin American country during Ellicott's 75-year history.

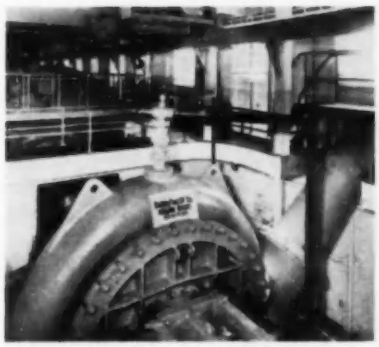
The floating excavator has a hull whose overall dimensions are 165 feet long, 42 feet wide and 12 feet 4 inches deep. It is equipped with a ladder 70 feet long, and is capable of digging to a depth of 46 feet.

There is a total of 5,000 connected horsepower, with the dredging pump driven by a Cooper-Bessemer LSV turbocharged slow-speed engine that delivers 3,200 hp at 360 rpm. The dredge has a maximum rated output of 2,100 cubic yards per hour, and can pump through pipelines ranging up to a maximum length of 9,000 feet.

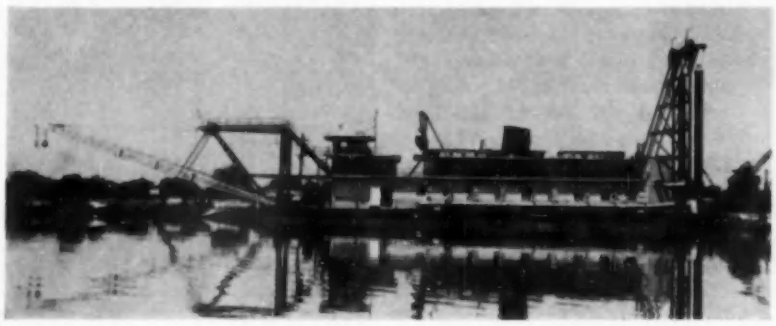
Designed for round-the-clock operation, the dredge contains complete living quarters for 45 officers and crewmen. It is also equipped with a machine shop to enable machinery repair to be made without loss of working time.

The *Parana* and the other dredging equipment is being purchased by the Brazilian government for a widespread program of port development and maintenance. Sixteen harbors ranging from Belem at the mouth of the Amazon River to Rio Grande near the Uruguayan border are scheduled for rehabilitation by the dredging fleet. This program was developed after an extensive survey of the ports of Brazil in which Ellicott's engineers participated.

The channels and maneuvering areas in the various harbors are subject to heavy silting that hampers navigation. The present lack of modern, efficient dredging equipment has made this problem serious. Brazil's ports have top economic importance because the country's entire foreign trade moves by ship.



***Parana's* 24-in. diameter dredge pump has a discharge capacity of 30,000 gallons per minute.**



TRIAL SAMPLES
Of World-Famous WHITMORE'S Lubricants

OPEN CHAIN LUBRICANT INCREASES CHAIN LIFE UP TO 300%

Penetrates, lubricates, prevents rust. Lubricates deep into chain linkage to reduce friction on pins, rollers, bushings, pressure surfaces. Corrosion inhibitor prevents rust in vital working mechanisms. Lubricates close-tolerance internal surfaces to increase chain life up to 300%. Highly recommended for all climatic conditions to stop rust and corrosion even in salt atmospheres.

Packaged in handy 16 oz. aerosol spray-on containers or in bulk — send for a free trial sample.

ANTI-FRICTION COMPOSITIONS HAVE NO MELTING OR DROPPING POINT

Packaged in 14½ oz. cartridges for handy application with lever-type cartridge guns for constant protection to roller, ball, sleeve bearings and sliding surfaces in "hot" bearing applications or in areas with high ambient heat. Exclusive formulas have no melting or dropping point; moisture resistant; will not wash out; exceptional metal adherence properties; temperature reducing qualities; high extreme pressure values. Available in two grades. Whitmore's Anti-Friction Composition No. 1 (light density), recommended for high speed, high temperature applications. Anti-Friction Composition No. 2 (heavy density), for low-speed high-temperature applications or loosely-fitted bearings. Specify No. when requesting free trial sample.

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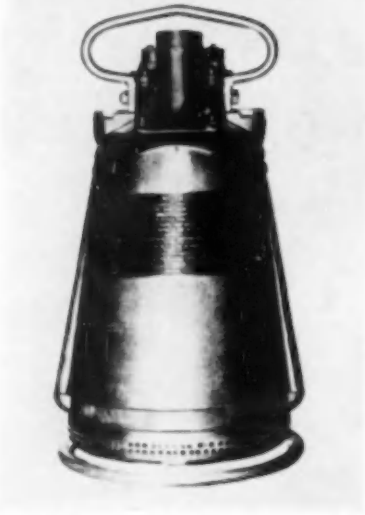
EQUIPMENT YOU OUGHT TO KNOW ABOUT

Electric Submersible Pump



Manufacturer: Flygt Corp., Department EE, Hoosick Falls, N. Y.

Claims: The Flygt 1½-in. model B-38L electric submersible pump is available in a 110-volt version equipped with 1.8-hp motor. With capacities to 85 gpm and heads to 90 feet, this model draws only 13 amperes, allowing it to be operated from most house currents and portable light plants.

Besides the 110-volt 1½-in. submersible model, the pumps are available in 220-volt single-phase, and 220/440-volt three-phase models.

Universal Carrier

Manufacturer: Crane Carrier Corp., Department EE, 1150 N. Peoria Ave., Tulsa, Okla.

Claims: Crane Carrier Corp. has started production of a new universal 25 to 30-ton carrier to tap the growing market for mass-produced vehicles.

To be known as the Universal 2564 carrier series, the new CCC carrier will be produced in a single model for 25 and 30-ton capacity uppers. More than 20 specifications for 25 and 30-ton uppers were tabulated to produce a design that incorporates the features most commonly needed.

The CCC Universal 2564 accommodates most of the ratings and gross vehicle weight capacity requirements of uppers manufacturers into one basic vehicle. Earlier delivery due to mass-production now can be promised the crane-carrier market. Crane Carrier officials predict that standardization of a carrier in this tonnage category will have a major impact on truck crane costs.

The Universal 2564 will not replace the 20 custom-designed crane carriers now produced by Crane Carrier. The Tulsa firm reports it will continue custom-manufacturing vehicles that will meet the most rigid specifications.

The new Universal 2564 is the latest in an expansion of CCC's entire manufacturing set-up. Recently the firm acquired the Maxi Co., Los Angeles. The Maxi carrier purchase made CCC the largest producer of self-propelled carrier vehicles designed for operation from the crane or shovel mounting.

Electric-Powered Tower Crane

Manufacturer: Bucyrus-Erie Co., Department EE, South Milwaukee, Wis.

Claims: A new electric powered tower crane—the first American-built machine of its type—has been developed by Bucyrus-Erie for use on multi-story building erection and major construction projects.

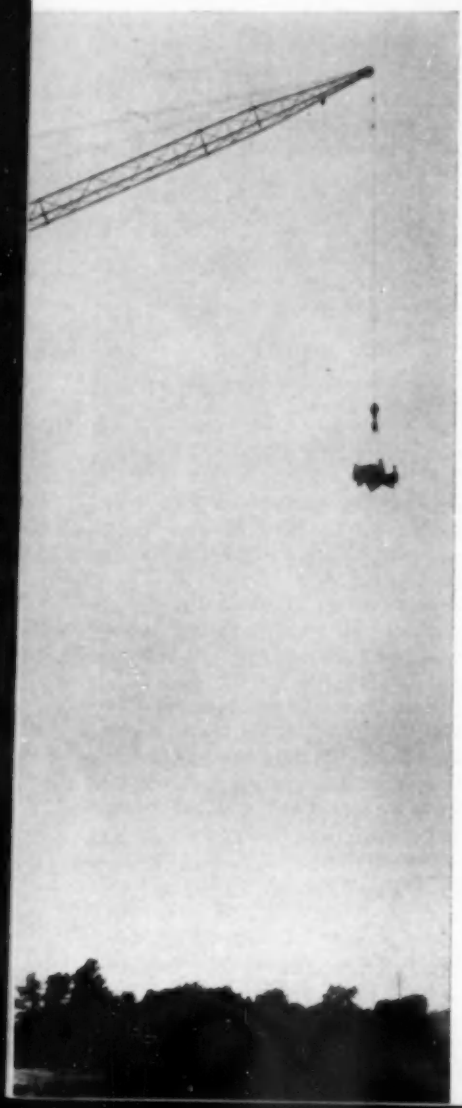
Designated the Mark I-50, the tower crane is designed to handle building-construction crane applications with a marked reduction in labor and materials handling costs. It offers a unique combination of extreme lifting height and reach with high line speed and mobility on rails. With its flexible, building-height tower and 60 to 120-ft. boom lengths, the Mark I-50 provides both vertical and horizontal liftability in one continuous cycle. Under average conditions, it can pour up to 50 cubic yards of concrete per hour . . . service any area on a building within range of its far-reaching boom.

Significantly, all four basic functions of this materials handling giant —swing, load hoist, boom hoist, and propel—can be operated independently or simultaneously for utmost efficiency. The operator can position his cab in the tower at a level providing the best visibility of the work area.

The manufacturer points out that French and German-built tower cranes gained widespread popularity in Europe after World War II, prin-

cipally through their effective use in post-war restoration work for which manpower was not available. In today's U.S. construction market, however, general rising cost is the major problem.

Applied to major building construction, the tower crane can effect a sizeable labor saving through its ability to place loads without rehandling. Its load carrying ability and fine hoisting control are ideally suited for steel setting jobs or other extremely precise work. In addition, it can be used economically wherever large work or storage areas must be dominated, particularly where conventional crawler or truck cranes are limited by the height or depth of a structure or by the space in which to move around or maneuver.



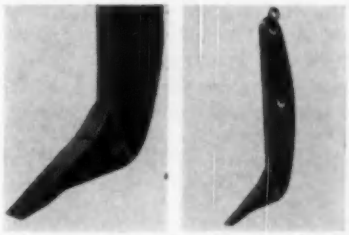
Ripper Point

Manufacturer: Electric Steel Foundry Co., Department EE, 2141 N. W. 25th Ave., Portland 10, Ore.

Claims: A new ripper point that is designed to dramatically increase ripping yardage has been introduced by ESCO's construction equipment division. The production advantages of the point are made possible by the radical length, narrowness and sharpness of the design and a new ESCO alloy—12S—that was specifically developed for ripping.

In extensive field testing the ESCO point has ripped material previously unrippable and has performed from two to ten times longer than other points. The extra length of the point shatters material well ahead of the ripper shank, greatly reducing shank wear.

ESCO is marketing the new ripper point design in four lengths to match ripping conditions, The shortest point, 14 inches in length, is designed to rip in extremely tough material where other points will not penetrate. The 16-in. point is intended for tough production ripping where it has increased yardage from 20 to 40% over competitive points. The 18-in. point is designed for use under general ripping conditions and it has increased production in this application by 30 to 50%. The 20-in. point is designed for extremely long service in easily ripped materials. It can increase production by 10 to 20% and will rip 5 to 10 times as long as other points.



The company is also marketing cast ripper shanks in Alloy 12M and weld-on nose sections that will convert any shank to ESCO ripper points.

Vibrating Compactor Attachment

Manufacturer: Aveling-Barford, Ltd., Department EE, Grantham, England.

Claims: A triple vibrating plate compactor, which Aveling believes is the first of its kind made in Great Britain, is now being offered as a rear-mounted attachment for three-

Continued on page 64

FOR 50 YEARS...
Finest in the Field!
Rely on the bucket contractors rely on. The Omaha Dragline Bucket gives full load with every cast. Perfect balance makes it easy to spot dump. Alloy steel cutting teeth stay sharp, tough and ready. Strike pay dirt now! Complete information and specifications await your letter.
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DRAGLINE BUCKETS

CUTTING CAPACITIES UP TO 1 INCH 1-1/16 INCH, AND 1-1/2 INCH.

THE
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WIRE ROPE CUTTER

FAST
Especially designed cutting blade and dies of the finest steel assure fast cutting action.

EASY
Anyone can operate it. The hammer principle eliminates any special skill requirements.

SAFE
The enclosed cutting blade locked in the body of the cutter assures perfect safety.

PORTABLE
Models for tool kit or stationary operation. Made in three sizes.

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New Equipment . . .

Continued from page 63

wheeled GC and GD road rollers (6-16 tons range).

On the attachment offered for GD rollers, each of the three vibrating plates has a ground contact area of 388 square inches and has a dead-weight of 430 pounds.

On GC rollers, the plates are slightly smaller, since the rolling width which they have to cover is less. Two contra-rotating electrically driven vibrators are fixed to each plate, together producing a vertically-acting force of 5,000 pounds per plate, when rotating at their maximum speed of 3,000 rpm. The three plates together cover the full rolling width of the machine.

The vibrators are driven by an 8-KVA alternating current generator which is directly coupled to a Petter air-cooled diesel engine. The vibrating plates are raised and lowered between working and travelling positions by the same rams as used to control the hydraulic scarifier, but these rams do not play any part in the compacting operation of the attachment. Contact between plates and ground is maintained solely by the weight of the plates.

The attachment will be used on base and sub-base work for compacting coarse aggregates, and in particular for filling the interstices in the latter with fine material. The number of roller passes required to achieve any specified density is expected to be considerably reduced.

Five New Crane-Excavators

Manufacturer: Marion Power Shovel Co., Department EE, Marion, Ohio.

Claims: Addition of five new models to its distributor-size machine line has been announced by Marion. They range in crawler crane ratings from 30 to 75 tons, and in shovel capacities from 1¼ to 1¾ cubic yards. The new model number designations are 45-M, 47-M, 65-M, 75-M and 77-M.

Many new features are designed to improve and diversify machine usefulness as cranes, while others will have special significance for dragline, hoe and shovel users.

Wide ranges of axle widths, crawler side frame lengths and crawler belt widths permit users to select combinations to meet a wide variety of flotation and lifting radii problems. The crawler side frame and axle designs permit convenient removal of the side frames as units for shipment.

Power load lowering, third drum, independent boom hoist, independent travel, torque converters and multiple speed transmissions are among the accessories available.

Crane models include capacities of 30, 40, 50, 60 and 75 tons, with boom and jib maximum combinations from 115 to 200 feet. The new models include drag and clamshell capacities

to 2½ yards, hoe capacities to 2¼ yards and shovel capacities of 1¼, 1½ and 1¾ yards.

Rubber-mounted versions of all five machines are planned for the near future. These new machines give Marion a total of 11 models of distributor-size machines, ranging from 21 to 110-ton capacity cranes and ¾ to 4 to 4½-yd. shovel capacities.

Tandem Rollers

Manufacturer: Buffalo-Springfield Div., Koehring Co., Department EE, Springfield, Ohio.

Claims: Buffalo-Springfield has added two new models to its line of

road rollers and compaction equipment. They are the KT24E 8-12 ton, and the KT25E 10-14 ton Deluxe tandem rollers.

Both rollers combine the quality features of the firm's heavy-duty tandems with the economy of its standard-duty models.

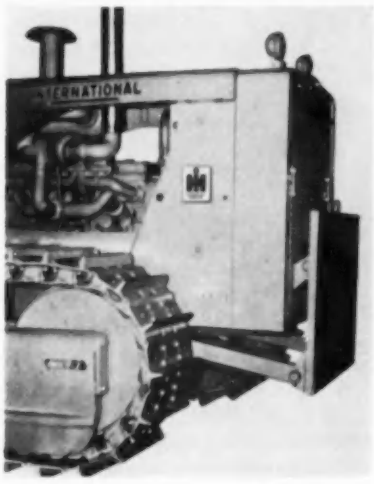
The Deluxe tandems are equipped with low pressure hydraulic steering systems to minimize operator fatigue; dual controls to provide optimum visibility for operators; and open grilles over both ends of drive rolls so that operators can see the roll edges at all times.

Adjustable bevel gear final drives of the two new rollers are protected by fully-enclosed armored frames.

Single-unit power train assemblies assure precise alignment of all components. Side air intakes make access to radiators easier and reduce danger of clogging.

Both models have machined rolls made from special manganese alloy steel; high-speed, low-torque reversing clutches; and rustproof sprinkler systems using brass pipes, copper tubing, and large capacity tanks equipped with filters.

Dozer Push Plate



Manufacturer: International Harvester Co., Department EE, 180 N. Michigan Avenue, Chicago 1, Ill.

Claims: A new, direct-mounted push plate is now available for the International TD-25 crawler. The model 25-PF distributes loads to four separate areas of the tractor main frame.

The 2-in. thick plate, measuring 48x42 inches, is mounted to the tractor frame by a rugged bracket-pin-strut arrangement. The top of the plate is supported by two 2-in. thick brackets, with the plate secured to the brackets by two 2¼-in. hardened steel pins.

The support brackets extend through slots in the lower radiator guard door to the tractor's lateral main frame member.

Two struts extend forward from the underside of the tractor engine frame to support the lower portion of the push plate. The plate is fastened to the struts by two 2¼-in. pins at these points also.

Offset and corner loadings are easily withstood, and the tractor can push with any part of the plate, whose flat surface and lipless design make it matchable with any width stinger. Positioning time and pusher and scraper cycle time is appreciably reduced.

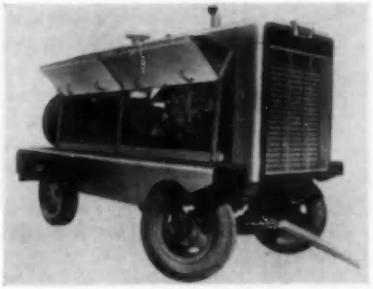
900-Cfm Compressor

Manufacturer: Worthington Corp., Department EE, Harrison, N. J.

Claims: A new 900-cfm Blue Brute portable rotary compressor uses Worthington's "Over-Under" design. This design puts the second-stage compressor cylinder directly under the first stage, providing the benefits of accessibility, easy maintenance and self-draining of compressor oil.

Effective oil separation is made possible through two stages. Instead of one expensive filter which must be discarded, the Blue Brute has two—a lifetime unit and an inexpensive final filter.

The compressor's automatic control stops the engine in case of high discharge air temperature, overheating of cooling water, or low engine oil pressure. The interlock control feature of the clutch prevents engaging the clutch while the engine is running,



and the cutout switch prevents starting the compressor with air pressure in the air receiver.

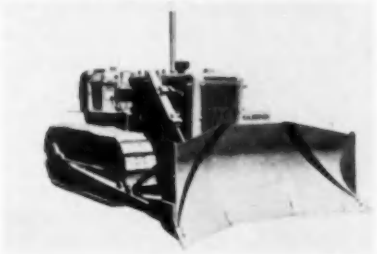
Dozer U-Blades

Manufacturer: Balderson, Inc., Department EE, Wamego, Kan.

Claims: Balderson U-blades are now available in two sizes for the new Cat D6B tractor. The regular 9-ft. 6-in. blade BD6U illustrated above is designed and built to do heavy-duty work, pond building, land clearing, pioneering and heavy material handling. The extra-large 12-ft. BD6U blade is especially for electric power plants and industries that have coal handling requirements to match its greater capacity.

Both of the U-blades are interchangeable with Cat straight blades on dozers in the field. On new installations, the Balderson U-blade uses Cat push arms and braces. The complete package, or a replacement blade, is available at all Caterpillar dealers.

The U-shaped design of the Balderson blade gives greater capacity than straight or angling blades.



LOW COST DE-WATERING with FLYGT ELECTRIC PUMPS

On a recent $23,180,000 Sewer Job in California, 8 separate contractors licked severe ground water intrusion on a pipeline excavation 19 miles long with more than 40 Flygt Electric, Submersible Pumps. The Flygt pre-dewatering systems drained and kept dry ditches along the right-of-way at low cost in comparison with other dewatering methods. Typical of contractor comments on the system is this statement by the J. S. Barrett Co., who placed 5½ miles of 78" line:

"You just drop Flygt Pumps in the hole, turn them on and make only routine inspections. They keep the ditch dry at realistic cost with none of the trouble normally experienced with suction-type pumps."

Flygt Electric, Submersible Pumps range from 1½" 85 gpm to 8" 3100 gpm capacity. Heads to 220'—higher in tandem. Designed and built for tough applications, they are adaptable to any dewatering job. Flygts run continuously with little attention, handle a high degree of solids, need no priming, are easy to handle and service. Ask today for literature and an on-the-job demonstration.

WRITE FOR NAME OF YOUR NEAREST DEALER

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LITERATURE FOR EARTHMOVERS

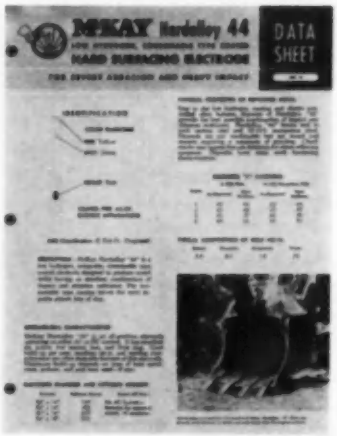
Subject: **1-Yd. Crane-Excavator**

Content: A 12-page catalog describes the Lorain model 50, a 25-ton, 1-yd. crawler mounted shovel-crane. The booklet gives details of construction including Lorain's "Joy-Stick" controls; square-tubular-chord-boom; oil-enclosed travel mechanism; it contains many photographs of the machines in action. The Lorain 50 converts to shovel, crane, hoe, clamshell or dragline.

Where to get: Thew Shovel Co., Department EE, Lorain, Ohio.

Subject: **Hard Surfacing Electrode**

Content: A two-page data sheet gives full details on operational characteristics, physical properties, weld metal composition and specific applications of a new McKay welding electrode developed especially for hard surfacing applications on carbon steel and austenitic manganese steel parts. Known as Hardalloy "44", the low hydrogen, composite, consumable-type coated electrode deposits a surface which resists extreme impact and severe abrasion. Hardalloy 44 is an all-position electrode and operates well on either AC or DC. It has a high deposition rate, low spatter loss and practically no slag. It is recommended for overlaying dredge pump impellers, bucket lips and teeth, hammer mill hammers, dozer blades, augers, paper break rolls, crusher screens, ditcher rollers and other equipment subject to heavy impact and severe abrasion.



Where to get: McKay Co., Department EE, 1005 Liberty Ave., Pittsburgh 22, Pa.

Subject: **Detroit Diesel Directory**

Content: A handy directory lists world-wide sales, service and parts outlets for Detroit Diesel engines. Over 600 outlets in the United States, Canada, Mexico and overseas are listed by state, province and country, giving addresses and in most instances telephone numbers that can be called day or night for parts and service. Ask for directory 8SA48.

Where to get: Detroit Diesel distributors and dealers, Diesel Engine Div., Department EE, General Motors Corp., 13400 W. Outer Drive, Detroit 28, Mich.

Subject: **2½-Yd. Loader**

Content: Described as the machine that "never stops moving," the new Caterpillar 977H Traxcavator is the subject of an eight-page booklet. Features of the new unit include a new turbocharged engine with horsepower raised to 150 from 100; a new power shift transmission coupled with a speed range selector to give four speeds forward or reverse; a new dry-type air cleaner; and a hydraulic system producing 27% greater pry-out force than earlier models. Bucket capacity of the 977H is 2½ yards, up from the 2¼ yards of the previous unit. Ask for form 33790.

Where to get: Caterpillar Tractor Co., General Offices, Department EE, Peoria, Ill.

Subject: **Tandem Rollers**

Content: Buffalo-Springfield's recently announced Deluxe tandem rollers are the subject of a new 4-page bulletin.

The literature covers the KT-24E (8 to 12 ton) and KT-25E (10 to 14 ton) Deluxe tandem rollers. Both models are offered with torque converter drive as standard equipment. A 4-speed

mechanical transmission is optional. Both models feature exclusive adjustable bevel gear final drive, fully enclosed armored frame, single unit power assembly, full working visibility, rigid frame construction, and many other quality components. Buffalo-Springfield is a division of Koehring Co.

Where to get: Buffalo-Springfield Co., Department EE, Springfield, Ohio.

Subject: **Underdrain Pipe**

Content: A four-page folder describes the use of Transite underdrain pipe in subsurface drainage systems for highways, airports, flood control projects, plant sites and similar projects. Photographs show how Transite perforated asbestos-cement pipe is installed and assembled with its unique plastic coupling. In addition, drawings illustrate how modern subsurface drainage practice has been followed in determining hole sizes, distance between holes, and method of perforation for the various sizes of Transite pipe. The sizes include 6, 8, 10 and 12-in. diameters. Lengths are 10 and 13 feet. The minimum crushing strengths (ASTM 3-edge bearing method) are also shown. Ask for folder TR-246A.

Where to get: Johns-Manville Corp.,

Department EE, 22 E. 40th St., New York 16, New York.

Subject: **Engine Pamphlet**

Content: Twenty-seven International diesel and carbureted engines—in four, six and eight-cylinder versions—are detailed in a new, three-color pamphlet. Of the 27 units (which are available from stripped engines to complete power units) 10 are diesels, with two or four-cylinder design and eight of the six-cylinder category. In the carbureted line, shown are two four-cylinder units; 12 of six cylinders; and three V-8 models. Horsepower ratings range from 16.4 to 385. Weights are from 279 to 6,045 pounds. Ask for pamphlet CR-764-K.

Where to get: International Harvester Co., Department EE, 180 N. Michigan Ave., Chicago 1, Ill.

New Movie . . .

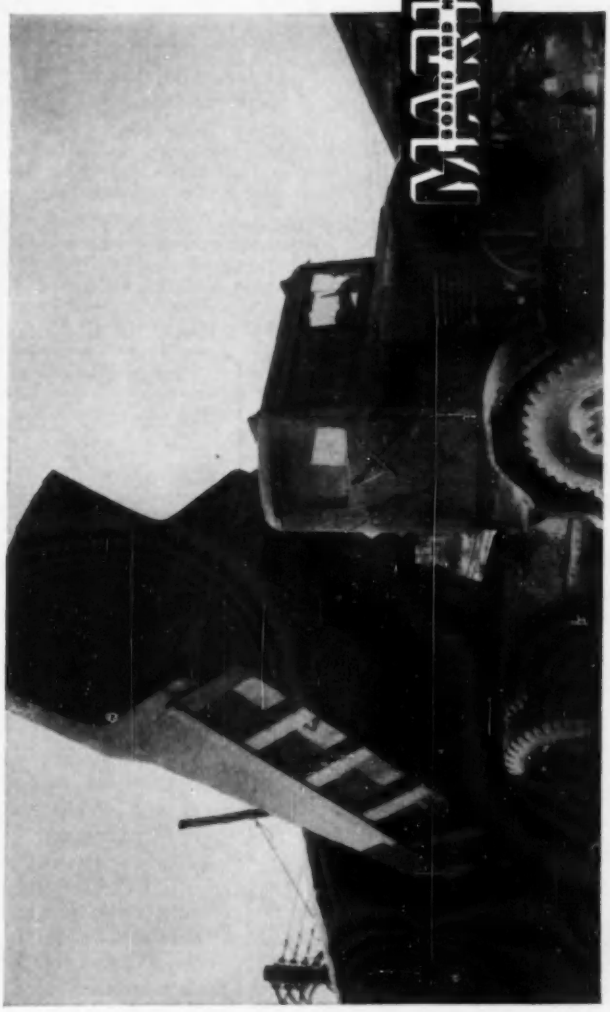
Subject: **High-Speed Compaction**

Content: A new film illustrates how modern, fast compaction equipment can reduce job costs. The 12½-minute color film, *Hyster High-Speed Compaction*, outlines development of the Hyster DW20A compacter and model D compaction rollers. This equipment increases compaction volume to match earthmoving volume. Compaction costs are compared by stacking a Hyster DW20A tamping compacter against a five-by-five sheepsfoot roller, pulled by a Cat D8 tractor. With all operating factors equal, the Hyster DW20A shows a cost of 2.1 cents per cubic yard; less than half the 4.3 cent per cubic yard cost incurred with the sheepsfoot roller. The film also shows that requirements of different soils brought about development of two types of compaction wheels. Sloped-foot tamping wheels give maximum compaction of plastic soils, while open-surfaced "grid" wheels are matched to granular soils.

Where to get: Hyster Co., Department EE, P. O. Box 328, Peoria, Ill.

Marion rock bodies are **BUILT TO TAKE IT!**

Fleet of Marions On The Job Regularly Since 1954 Provide Top Payload Performance With Minimum Downtime At Indiana Quarry



Seven Marions—two in service since 1948 and five since 1954—have been giving their owners top payload performance with minimum downtime.

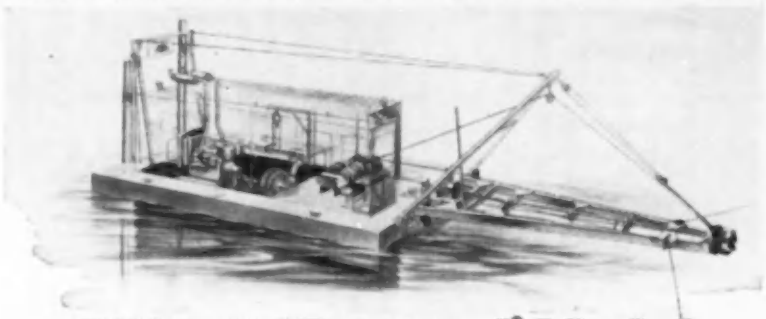
Each unit hauls about 280 tons per day in 35 trips from the quarry to the crusher. The bodies are RB-50s, 5 cubic yards, with sideboards. The double arm underbody hoists are HD-8s.

Other Marion equipment in use at this ultra-modern quarry includes 5 trailer dumps, 5 tandem axle and 5 single axle units. The owners also use Marion equipment exclusively at their other two operations—a quarry and a coal mine.

If you want more information about how rugged Marion rock bodies and heavy duty hoists can help your quarry operation, write direct or see your Marion Distributor.

MARION METAL PRODUCTS CO.
Marion, Ohio, U.S.A.

The Most Advanced Dredges in Their Class



Ellicott "Dragon"® Model Portable Dredges

Here's why:

1. These are dredges in which portability is a reality not a possibility. *Patented* 2-piece hull disassembles quickly and can be reassembled on shore or in the water. Exclusive Ellicott design places all connectors above the water, insuring against leaks.
2. All components are designed and built by Ellicott whose centralized engineering and manufacturing responsibility insures quality control.
3. "DRAGONS" are completely electro-hydraulically operated with unified controls to facilitate handling ease, lessen operator fatigue and raise outputs. *This kind of control was first introduced by Ellicott on portable dredges over 10 years ago.*
4. Because severe damage can often occur when equipment is submerged from view, Ellicott locates *all primary machinery above the water,* eliminating the downtime of costly accidents from cave-ins or debris entanglement.
5. Products of experience gained by a company which has concentrated on designing and building dredges of all types and sizes for 75 years. This know-how unequalled by any other dredge builder.

These and other exclusive Ellicott designed features spell out why today's rugged durable "DRAGONS" are recognized everywhere to be top performers as proved by their work on road construction, land reclamation, industrial pond clearance and waterway maintenance. To find out more about them, their accomplishments and how one is suitable for your construction operations, write for Bulletin 980. Please fill in the handy coupon.

ELLICOTT DREDGES

ELLICOTT MACHINE CORPORATION, Baltimore 30, Maryland, U.S.A.; Ellicott-Brandt, Inc., Baltimore, Maryland; Ellicott Fabricators, Inc., Baltimore, Md.; McConway & Torley Corp., Pittsburgh, Pa.; Timberland-Ellicott, Limited, Woodstock, Ontario, Canada; Dragues Ellicott, France, Paris, France; Dragas Ellicott do Brasil Ltda., Rio de Janeiro, Brazil; Ellicott de Mexico, Mexico City, Mexico.
Successors to the floating dredge business of the Bucyrus-Erie Company and the American Steel Dredge Co. Complete engineering, design and construction service.

Marking Our 75th Year

ELLICOTT MACHINE CORPORATION
1600 Block of Bush Street, Baltimore 30, Maryland

Send me a copy of Bulletin 980, describing "DRAGONS," "The Ultimate in Portable Dredge Engineering."

Name_____

Firm_____

Address_____

City_____ Zone____ State_____

NOTES from the Manufacturers

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has announced the organization of six construction machinery sales regions, and the creation of the new position of general products manager within the construction machinery division. The separate sales regions are designated geographically as northwest, western, central, eastern, southern and northeast. H. T. Larmore has been appointed to the new position of general products manager of the construction machinery division. He will coordinate the sales activities with engineering and manufacturing of the firm's line of construction machinery products produced at plants in Springfield and Deerfield, Ill., and Cedar Rapids, Iowa. Prior to his new appointment, Larmore had been sales manager for crawler tractors and motor graders.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed Construction Equipment Co., 21720 W. Eight Mile Rd., Detroit, Mich., as distributor for Hydrocrane equipment, in addition to the commercial crane and excavator line it now handles. The firm provides sales and service on the full line of convertible crane-excavators; dragline buckets; cranes and all-hydraulic Hydrocranes. The firm's territory covers Michigan's lower peninsula.

Koehring Div., Koehring Co., Milwaukee, Wis., has appointed Willis Fisher as product manager for the firm's line of concrete paving and paving maintenance equipment. The line includes the world's largest concrete paver, the Tribatch; two other sizes of pavers; longitudinal and transverse finishers; and Mud-Jacks. Fisher joined Koehring in 1957 as a sales trainee.

Owen Bucket Co., Cleveland, Ohio, has named three distributors to sell and service its lines of clamshell buckets and rock, scrap and pulpwood grapples. Euclid—Tennessee, Murfreesboro Rd., Nashville, Tenn., will cover the middle portion of the state of Tennessee. T. E. Potts Equipment Co., Inc., Sheridan Drive, Buffalo, N. Y. will service western New York state, including the Rochester area. Mussens Canada, Ltd., 1100 Norman St., Lachine, Montreal, Quebec, will service the Canadian provinces of Quebec, New Brunswick and Nova Scotia.

Unit Crane & Shovel Corp., Milwaukee, Wis., has named two distributors for its line of ½ to ¾-yd. size shovels and cranes. Riebel Equipment Co., 5580 W. Broad St., Columbus, Ohio, will service southeast Ohio. White Oil and Equipment Co., Box 5304, Bossier City, La., will service northern Louisiana.

TO ADVERTISE: All advertising in this section is payable in advance. Rate $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters. Count spaces and punctuation as one character each. Be sure to enclose the correct amount of money with your order. Rates and conditions subject to change without notice. Closing date—10th of preceding month. Example: January closes December 10th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the listed address. If box number is used, mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

HEAVY EXCAVATION EQUIPMENT
DRAGLINES, SHOVELS, CRANES, DRILLS, TRUCKS

15-W B-E elec. drag, 215', 12-yd.
450-W B-E diesel drag, 165' w/extra 10, 12, 13 & 14-yd. buckets.
9-W B-E elec. drag, 165', 10-yd.
9-W B-E diesel drag, 165', 12-yd.
7-W B-E diesel drag, 140', 7-yd.
7400 Marion diesel drag, 175', 13-yd.
7400 Marion elec. drag, 175', 12-yd.
1855 P&H diesel drag, 130', 10-yd.
625 Page diesel drag, 160', 9-yd.
621-S Page diesel drag, 125', 7-yd.
71-B B-E Crane w/160' boom.
200-W B-E diesel drag, 125', 6-yd.
2400 Lima elec. drag, 130', 6-yd.
2400 Lima diesel drag, 130', 6-yd.
4500 Manitowoc drag, 120', 5-yd.
120-B B-E elec. drag, 115', 5-yd.
3900, 3500, & 3000 Manitowoc cranes.
111-M Marion drag, 100', 4-yd.
1601 Lima 4-yd. shovel/drag.
1055 P&H drag, 80', 4-yd.
1201 Lima dragline, 85', 3-yd.
54-B B-E drag, 80', 2½-yd.
5560 Marion 26-yd. elec. shovel.
190-B B-E 8-yd. elec. shovel.
151-M Marion 7-yd. elec. shovels.
1600 P&H 6-yd. elec. shovels.
170-B B-E 6-yd. elec. shovel.
4161 Marion 6-yd. elec. shovel.
2400 Lima 6 yd. Std. & H.L. shovels.
120-B B-E 4-yd. elec. shovel.
1055 P&H 3-yd. H.L. shovel.
111-M Marion 4-yd. standard & H.L. shovels.
1201 Lima & 54-B B-E standard shovels.
#6 Northwest 1½-yd. standard shovel.
Model T-650 Reich drill truck mtd. rotary and down-the-hole.
Ingersoll-Rand truck mtd. & crawler mtd. Drillmasters.
Keystone #50 truck and mtd. Stardrill.
Euclid trucks, rear & bottom dump; dozers, etc.

FRANK SWARB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa.
GLadstone 5-3658

EUCLIDS
Rear, Bottom and Scrapers

12-yd. Bucyrus-Erie dragline.
9-yd. Bucyrus-Erie dragline.
6½-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie dragline.
3-yd. Bucyrus-Erie shovel.
2½-yd. Bucyrus-Erie shovel and dragline.
1½-yd. Bucyrus-Erie shovel.
5-yd. Manitowoc dragline.
6-yd. Lima dragline and shovels.
Large stripping shovels.
Other equipment available, not listed above.

WILLIAM LUBRECHT, III
Construction Equipment
311 W. Diamond Ave. Hazleton, Pa.
Phone: GLadstone 5-4041 or 5-0523

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

Marion 151M #8850
Marion 482 #6353
Marion 492 #7494
Marion 4161 #8197
Bucyrus-Erie 54-B Diesel #95643
Bucyrus-Erie 54-B Diesel #103533
Bucyrus-Erie 120-B #62821
Bucyrus-Erie 120-B #15220

All equipment subject to prior sale.
Contact:

PICKANDS MATHER & CO.
Purchasing Department
700 Sellwood Building
Duluth 2, Minn.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

SHOVELS, CRANES & ATTACHMENTS

Bucyrus-Erie model 38-B, 1½-cu. yd. shovel, powered by International UD-1091 diesel engine, 1956 model. Excellent condition. $32,000. FOB Elizabethtown, Ky.

Bucyrus-Erie model 22-B, ¾-yd. hoe powered by International UD-525 diesel engine. Less than 3 years old. Excellent condition. From our rental fleet. $18,750. FOB Elizabethtown, Ky.

Bucyrus-Erie model 22-B, ¾-yd. dragline and clamshell combination. 40' boom. Powered by International UD-525 diesel engine. Less than 3 years old. From our rental fleet. Excellent condition. $18,750. FOB Elizabethtown, Ky.

Bucyrus-Erie model 15-B, ½-yd. dragline with 35' boom, 20" treads. Powered by International UD-9A diesel engine. $9,500. FOB Louisville, Ky.

Bucyrus-Erie model 15-B, ½-yd. shovel, powered by Caterpillar D4400 diesel engine. Electric starting, good operating condition. $5,500. FOB Elizabethtown, Ky.

Bucyrus-Erie model 10-B dragline, powered by gasoline engine, 35' boom. $5,500. FOB Evansville, Ind.

Lorain model 820, 2-yd. shovel, powered by Caterpillar D13000 diesel engine. $13,000. FOB Elizabethtown, Ky.

Lorain model 40, ¾-yd. shovel on crawlers. Powered by gasoline engine. $4,500. FOB Elizabethtown, Ky.

P&H model 255-A, ¾-yd. shovel, crawler mounted. Powered by Caterpillar model D315 diesel engine. $12,500. FOB Elizabethtown, Ky.

Lorain model TL-20 dragline with 45' boom. Waukesha gas engine. Undercarriage rebuilt. Good operating condition. $7,000. FOB Evansville, Ind.

General model 307, ¾-yd. dragline with 45' boom and fairleads. Powered by Waukesha gasoline engine. $7,000. FOB Evansville, Ind.

Unit ½-yd. shovel, powered by Chrysler Industrial gasoline engine. $3,750. FOB Evansville, Ind.

Write—Wire or Phone Jim Waddell

BRANDEIS MACHINERY & SUPPLY CO.
Louisville 1, Ky.
P. O. Box 1705 MElrose 7-4741

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

AT HOUSTON

Bucyrus-Erie 22-B dragline, S/N 75783, IHC UD14-A diesel engine, 26" track shoes, 40' boom.
Bucyrus-Erie 22-B backhoe, S/N 119174, IHC UD-525 diesel engine, Esco dipper, tractor-type tracks, 19A swing brake.
Bucyrus-Erie 22-B (Std.) dragline, S/N 107904, Cat D318 diesel engine, 26" shoes, 40' boom.
Bucyrus-Erie 22-B dragline, S/N 119178, IHC UD-25 diesel engine, 45' boom, tractor-type tracks, 19A swing brake.
Lorain 30, ½-yd. shovel, S/N 10198, gas engine.
Lorain TL-20 dragline, S/N 15456, 35' boom, Cat. D4400 diesel engine, 22" track shoes.
Lorain TL-25 ¾-yd. backhoe, S/N 23276, Cat D315 diesel engine, 22" shoes.
Northwest 25 dragline, S/N 19079, 35' boom, 28" track shoes, Cat D318 diesel engine.

ATTACHMENTS

Bucyrus-Erie 20-A hoe attachment w/¾-yd. B-E dipper for 22-B (straight boom).
Bucyrus-Erie hoe attachment (straight boom) for 15-B.
(2) Bucyrus-Erie 20-A hoe attachments w/¾-yd. Esco dipper for 22-B (cambered boom).
Yaun ⅝-yd. bucket, S/N 4600.
Blaw-Knox ⅝-yd. general purpose bucket, S/N H8810.
Hendrix ¾-yd. bucket, S/N 1018.
Hendrix ⅝-yd. bucket. S/N 7316.

AT DALLAS

Bucyrus-Erie 54-B, 2½-yd. shovel, reconditioned.
Bucyrus-Erie dragline S/N 73017, 45' boom, Cat D318 diesel engine, good condition.
P&H ½-yd. dragline. S/N 59060.
Quickway E shovel mounted on White tandem truck.
Lorain-41 dragline, S/N 14432.
Bucyrus-Erie shovel, S/N 77116, good condition.
(2) Northwest 25, ¾-yd. backhoe S/N 11313 & 19060, General Motors diesel engine, reconditioned.
(3) Northwest 25 dragline S/N 19050, 19078, and 19079, 35' and 50' booms, Cat diesel engine, reconditioned.
Insley, L. dragline and clamshell.
Insley L. backhoe.
Insley K12 backhoe, S/N 55690.
Insley K12 dragline S/N 1801, 35' boom, IHC U9 gas engine.
Northwest 25, truck crane, S/N 11957, 35' boom, M-M engine, mounted on Dart carrier, reconditioned, excellent condition.

ATTACHMENTS

Backhoe for Schield-Bantam T-35, excellent condition.
Backhoe for LS-50 Link-Belt.
Shovel attachment for Bucyrus-Erie 10-B.
Shovel attachment for Marion 362, 1½-yd., excellent condition, all at Dallas.

AT LUBBOCK

Bucyrus-Erie 22-B backhoe, S/N 94757, straight boom, Cat D318 diesel engine, std. flat tracks, good condition.
Bucyrus-Erie 22-B backhoe, S/N 11460, straight boom, IHC UD-525 diesel engine, std. flat tracks, good condition.
Bucyrus-Erie 22-B dragline, S/N 10600, 35' boom, Cat D318 diesel engine, std. flat track, good condition.

If Interested Call Collect

BROWNING-FERRIS MACHINERY CO.

Dallas	
305 Exposition Ave.	**TA 3-8121**
Longview	
Highway 80	**PI 9-2761**
Lubbock	
2424 Clovis Rd.	**PO 5-7455**
Houston	
2619 Texas Ave.	**CA 5-3231**

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

BACKHOE & CRANE

1—Link-Belt model LS-80 crane with 50' boom, Rudomatic tagline, Buda gas engine, s/n 7074

1—Link-Belt model LS-60, Buda gas engine, s/n 8428.

1—Bucyrus-Erie 10-B crawler-mounted backhoe, s/n 16626; powered by Buda model 326-hp. 6 cylinder gasoline engine, s/n 11579. Backhoe with 14' boom, 4'6" stick, 29" wide bucket at side cutters with 3 teeth mounted on 9' long x 7'8" wide crawlers with 14" pads.

DRAGLINE

1—Bucyrus-Erie 10-B gasoline powered backhoe, standard cats, excellent condition, s/n 20429.

MISCELLANEOUS

1—LeRoi 315 air compressor on 4 pneumatic tires, 7 or 8 years old.

1—Ruhr M-1—½-cu. yd. heavy-duty grapple, new, excellent buy.

1—Wayne 36" rider industrial vacuum pick-up sweeper, demonstrator, 2 years old.

1—CMC Jetcrete with all accessories. Excellent condition, practically new with all extra accessories.

1—Used Kennedy-VanSaun revolving scrubber screen, 48" dia. x 21' long, in excellent shape and complete with all new parts including extra scrubber sections and new sizing screens.

2—Caterpillar D13000 power units in good shape with radiator less clutch, s/n 3R8157SP and 3R8098SP.

1—Clark 10,000-lb. fork lift, solid tires.

1—Towmotor LT44 with pusher attachment on solid tires.

S. M. CHRISTHILF & SON, INC.
Timonium Rd. & Harrisburg Expressway
Timonium, Md.

Bucyrus-Erie 38-B standard shovel. Serial #45514, delivered January 1946. Powered by GM diesel. For further information write:

EXCAVATING ENGINEER
Box 3755
South Milwaukee, Wis.

Lorain TL-25S shovel with Cat D3i5 diesel engine. Serial #25164. Price f.o.b. Charlotte, N. C. $8,000

Allis-Chalmers TS-360 motor scraper. Serial #1315. Price f.o.b. Greensboro, N. C. $19,500

Northwest 80-D dragline with 3-yd. Hendrix dragline bucket and model 21 Murphy diesel engine. Serial #8932. Price where is, as is, near Durham, N. C. $18,500

Link-Belt K-580 2½-yd. shovel with Cat D17000 engine. Serial #2733. Price where is, as is, near Greensboro, N. C. $23,000

E. F. CRAVEN CO.
P. O. Box 3307 — 515 S. Eugene St.
Greensboro, N. C.

Bucyrus-Erie model 10-B dragline, serial No. 88595, with Buda gasoline engine, 28' crane boom. Good working condition $3,500

Bucyrus-Erie model 38-B 1½-yd. shovel, serial No. 112162 with Caterpillar D13000 diesel engine, Kohler light plant, standard crawlers with 32" treads. Location—northern New Jersey.

Bucyrus-Erie model 51-B 2½-yd. shovel, serial No. 62581 with Caterpillar D17000 diesel engine, standard crawlers with 36" treads. Low hours. Reconditioned and in very good condition throughout.

Unit model 614 ½-yd. backhoe, serial No. 50062 with 2-71 G.M.C. diesel engine. Good condition throughout $7,850

Unit model 1020 backhoe, serial No. 49052. With GMC 3-71 diesel. As is $4,500.

Bay City model 45 ¾-yd. backhoe, serial No. 6110 with Caterpillar D318 diesel engine. Good condition. $12,000. Other attachments available.

Bay City 45 ¾-yd. backhoe, serial No. 5993 with Caterpillar engine, standard crawlers. Reconditioned and ready to work. $13,750.

Bucyrus-Erie Hydrohoe attachment for H-3 Hydrocrane complete with 18" general purpose dipper, 20" utility dipper, 12" narrow dipper and all necessary fittings. Excellent condition. Complete $750

Bucyrus-Erie 22-B shovel front complete with dipper trip, chains and lagging. Good condition $1,500

Lorain ¾-yd. shovel front, Amsco bucket complete with dipper trip. Excellent condition throughout $1,500

Bay City 45 ¾-yd. shovel front complete with dipper trip. Good condition ...$1,500

BINDER MACHINERY CO.
Brighton St., Union, N. J.
MUrdock 8-0060

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

EXCAVATORS

1—Lima model 604 combination 1½-yd. shovel and dragline, HIS Cummins engine, shop checked, ready to go. Either or both attachments.

1—Lima model 34 combination ¾-yd. dragline and trenchhoe, Caterpiller D318 engine. A serviceable machine, priced to sell.

1—Lorain model TL-25 dragline, 35' boom, Caterpillar D315 engine, wide tread, track, 22" pads, serviceable and repaired.

1—Koehring model 304 ¾-yd. shovel, Esco dipper, GMC 3-71 engine. A serviceable machine workwise, ready to go.

1—Link-Belt model LS-71 ¾-yd. dragline, 45' boom, UD-14A International engine, serviceable, clean, good condition.

1—Bucyrus-Erie model 10-B upperworks equipped as hoe, Buda 6B-273 engine, 26" dipper, mounted on Crane Carrier Corp. 6 x 6 carrier, Chrysler engine, 9.00 x 20 tires. Machine and carrier are clean, in first class condition. A good buy.

1—Insley model K-12 dragline, 30' boom, Chrysler 8 engine. Clean and serviceable.

EXCAVATOR ATTACHMENTS

1—Bucyrus-Erie 38-B shovel attachment 2-yd. Esco dipper. Excellent condition.

1—Bucyrus-Erie 22-B shovel attachment complete. Clean and serviceable. A bargain.

1—Bucyrus-Erie 120-B dragline attachment, 90' boom, fairleads, complete deck equipment, good condition.

1—Lima 34T hoe attachment 30" dipper, excellent condition.

1—Osgood 200 hoe attachment plate type dipper 36" cut with side cutters. Good condition. A bargain.

TRUCKS AND SCRAPERS

4—Caterpillar DW20's; two completely serviced and painted. Two with new type turbo charged engines. Good rubber. Ready to go to work.

2—Euclid model 23-TDTs with model 122-W bottom dump wagons 6-11 GMC engines. Good condition. Located at Los Angeles, Calif.

2—Allis-Chalmers TS-300 scrapers, GMC 6-71 engines. Good rubber. Cleaned and serviced. Ready to go to work. A bargain.

2—Allis-Chalmers TS-200 scrapers AC-Buda type engines, good rubber. Clean and serviceable.

2—LeTourneau Model CR scrapers; one with GMC 6-71 engine, one with Cummins. Workwise. Needs minor attention. Bargains if you can use them.

3—LeTourneau Super "C" scrapers, priced to sell. Service, parts, or salvage. Look them over. Worth our price plus.

2—LeTourneau LS pull type scrapers, clean, fair rubber, bargains if you can use them.

2—Euclid 14TDT scrapers, Cummins engines, good buys. Located at Caspar, Wyo.

5—Koehring WD-60 Dumptors; some on rental. Will be serviced mechanically. Rubber new or caps. GMC 4057C engines. See these units if you need Dumptors.

MOTOR GRADERS & MISCELLANEOUS

1—Caterpillar 12 grader 9-K series, new recap tires rear, 12:00 x 24 8-ply front. No cab.

1—Woods model 54 tractor-drawn Roadmixer, PTO for Caterpillar D8 Chrysler engine on accessories. A good clean machine. Ready to go to work.

1—Standard maintenance type asphalt distributor, trailer mounted, complete, burners and hand spray.

1—Bonded 3 x 10 double deck inclined screen, 4-bearing shaft, repaired, serviced, cleaned and painted. A good unit.

1—Universal 20 x 36 roller bearing jaw crusher, cast base, one flywheel grooved, mounted on steel wheel chassis with 24" x 25' conveyor.

1—Caterpillar model 8U dozer, mold board and pusharms, clean, ready to go.

1—CMC 16s concrete mixer with Winslow unibatch, scale complete, a good serviceable mixer, priced to sell.

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SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Lima model 34 crawler-mounted clam-digging-hoe combination, Buda gas engine, 35' boom, dragline fairlead, tagline reel, hoe boom with dipper. Priced to sell. Will sell with one or both attachments.

Unit model 357 rubber-tired wagon crane, equipped with new Chrysler Industrial engine, 25' boom, tagline reel, overhauled machinery, repainted, excellent condition.

Lorain model 55 crawler-mounted shovel, equipped with UD-18 I.H.C. diesel engine. 25-ft. boom, tagline reel, overhauled machinery, operating condition.

Bay City model 45 crawler-mounted dragline-clamshell machine, equipped with Cat D4600 diesel engine, long crawlers, 45' boom, tagline reel, dragline fairlead.

Gradall model 2460. New in 1957, equipped with G.M.C. Series 3031C diesel engine on upper works. Mounted on Duplex 6 x 4 truck carrier. Included are 24" and 36" digging buckets and frost ripper. Machine in excellent condition and priced to sell at $18,000 our yard. No trades on this special.

Bucyrus-Erie model 22-B crawler-mounted hoe. Powered with Cat D318 diesel engine, long frames and wide treads. Cambered type hoe boom, ¾-yd. hoe dipper. Machine new in late 1955. Excellent condition.

Bucyrus-Erie model 22-B crawler-mounted hoe or crane. Powered with Cat D318 diesel engine, long cats, 30" crawler treads. Machine new in late 1955. Excellent condition.

Bucyrus-Erie model 11-B demonstrator 10-ton Transit Crane, equipped with up to 70' of boom. Six wheel drive carrier. Hoe equipment also available. Like new condition.

Northwest model 80-D shovel. Good working condition. Call or write for more details.

Lorain model 80-J crawler-mounted crane. Write for more details.

HYDROCRANES

Model H-2 Bucyrus-Erie Hydrocrane mounted on a Chevrolet truck chassis, equipped with 2-piece boom, rear outriggers, reel and bucket available. Priced to sell at $2,500 at our yard.

Model H-3 Hydrocrane, 1953, mounted on G.M.C. truck chassis. 2-piece telescopic boom, tandem outriggers, operator's cab, tagline reel, hose, ¾-yd. Hydrocrane clamshell bucket. Recently overhauled. Very good condition.

Model H-3 Bucyrus-Erie self-powered Hydrocrane, 1955, mounted on Army surplus six-wheel drive carrier powered with G.M.C. engine, 2-piece telescopic boom, operator's cab, tandem outriggers, tagline reel with hose, ¾-yd. clamshell bucket. Ford 4-cylinder Industrial engine on Hydrocrane upper works. Very good condition.

Model H-3 Hydrocrane, 1952, mounted on Ford truck chassis, equipped with 2-piece telescopic boom, operator's cab, tagline reel, ¾-yd. clamshell bucket. Very good condition.

Model H-3 self-powered Hydrocrane, 1957, equipped with 2-piece telescopic boom, tandem outriggers, operator's cab with heater, reel and new style ¾-yd. twin-ram clamshell bucket, mounted on I.H.C. S-172 truck chassis. Complete machine in like new condition at a reduced price.

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1—Cat D7 angle dozer, sn 17A-13977

1—Cat D6 angle dozer, sn 17A-3684

1—Cat 212 motor grader

1—Allis-Chalmers scraper 8-10 cu. yds.

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MISCELLANEOUS EQUIPMENT

International TD-6 tractor, excellent condition. Running gear 65% to 70% good. A real nice unit for drawbar work $1,600

Caterpillar model D6 tractor, 9U series, 6A dozer. Double drum rear cable control. Guarded up and with operators guard. Undercarriage components 50% good. Good operating condition $7,500

Caterpillar D6 tractor, 9U series. Guarded up and with operator guard. Undercarriage components average about 30% good. Rails still rebuildable. Operates good $2,875

International TD-18, 181 series, with new type angledozer, allied rear double drum cable control. Guarded up. Undercarriage averages 60% good. Checked over in our shop. General appearance excellent. Has steering booster $10,500

Allis-Chalmers HD10W, equipped with Buckeye cable controlled angledozer. Also has a single drum rear skidding winch, and a double drum rear power control. Running gear averages 70% good. Good condition $2,500

International TD-6, wide gauge, with new Holl free-spooling skidding winch, Holt hydraulic angle dozer, with front mounted pump. All the guards including overhead operator guard. This machine has been checked over and repaired as necessary. The appearance is very good. Is in good operating condition. The undercarriage averages 60% good $4,750

Caterpillar D7 tractor, 3T series, excellent unit for heavy-duty drawbar work..$1,500

Caterpillar D6 tractor, 9U series, guarded up, good tractor or drawbar work....$2,500

International TD-18A-181 series, equipped with C-frame and Allied rear double drum cable control unit, all guarded up, rollers and sprockets, idlers, average 50% good, links 25% good, grousers 10% good. Right hand steering clutch has been overhauled, unit checked over, has hydraulic steering boosters $5,000

Caterpillar D4 tractor, 6U series, equipped with angle dozer, real good condition..$3,750

Allis-Chalmers HD6G shovel loader, serial No. 2254 with 1½ cubic yd. bucket. Worked a total of 3,600 hours since new. Engine completely rebuilt with new liners, pistons, bearings, and head. Checked over master clutch back including final drives, pins turned. Roller and idlers built, very good operating condition, 30-day guarantee. $10,750

International TD-6 with track, crankcase, radiator guards, operator guard. Straight hydraulic dozer. Checked over, repaired. $2,250

Oliver Cletrac OC-6 tractor with guard equipment, rear mounted skidding winch. Holt hydraulic straight dozer, front mounted on hydraulic pump. All steel operator guard. Good operating condition $2,500

International TD-14, equipped with Isaacson cable controlled angle dozer and Isaacson double drum cable control. Operator guard, roller and crankcase guards. The engine clutch and transmission have been completely rebuilt; rollers, idlers have been rebuilt and new rails installed $8,750

Cletrac DDH tractor equipped with hydraulic angle dozer, wide gauge general appearance good. Tracks good operating condition $800

Caterpillar D4 tractor, 60" gauge, 7U series, with track roller guards, radiator crankcase guards, all steel operator guard, rails, rollers, idlers rebuilt, steering and master clutch final drives repaired. No. 4A angle dozer with No. 44 hydraulic control. Also equipped with a LeTourneau skidding winch. Excellent operating condition. 30-day guarantee $7,500

Caterpillar D7 tractor equipped with 7A cable controlled angle dozer, front Caterpillar No. 24 cable control and Hyster Hyspeed skidding winch, operator guard, roller guard, has new tracks. This machine has been completely remanufactured. Bonded buy. 90 day guarantee.....$15,000

Wooldridge pull-type ripper for use behind D7 or D8, 2-teeth equipped with new shanks adaptors, and points, over $500 in repairs put into rebuilding this ripper. $1,750

LeTourneau model J 8-yd. scraper, good condition, rubber 40% good $1,500

Caterpillar D6 tractor, serial No. 9U 10943, with a 6A angle dozer, front mounted cable control, and Hyster Hyspeed skidding winch. Engine, master clutch, transmission, final drives, steering clutches, all checked and repaired as necessary. Undercarriage averages over 75% good. All guarded up including an all steel overhead operator guard. 90 day Bonded Buy guarantee $14,500

MISCELLANEOUS EQUIPMENT

Caterpillar No. 23 double drum cable control, will fit on D6 tractor $250

Caterpillar D2 tractor, with No. 44 Caterpillar hydraulic control and 2A Caterpillar dozer. Roller guards. Over $2,100 put into this machine in repairs. In excellent operating condition. Guaranteed for 30 days. Certified buy $4,500

Caterpillar D2 tractor, 5U series with 5-roller non-oscillating frame. Equipped with a new Teale bucket loader, ¾-yd. bucket, running gear averages better than 60% good. The machine has been completely through our shop and engine completely rebuilt including a new block. This machine is guaranteed for 30 days ..$6,500

Caterpillar #25 double drum cable control for D8 .....$1,050

Allis-Chalmers AD45 motor grader, late current model, tires better than 65% good, 13.00 x 24 rubber on all wheels, cab, cab heater, lights, scarifier, and 14' moldboard, all necessary repairs made, excellent operating condition. Used 40 months since new. $7,500

LeTourneau No. H3C ripper, equipped with two teeth, two tips 50% good. Balance of ripper in good condition and complete with cable $1,250

Allis-Chalmers model D motor grader. Good operating condition. Four cylinder gasoline engine, 10' mold board, scarifier, 9' dozer in front, rear bucket loader mounted on it, 7:50 x 20 tires, averaging better than 70% good $2,500

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Barber-Greene model 82A heavy-duty paving machine with floating clean-up scraper 14" x 6'5" crawlers, multiple speed-up, notched spirals, 72 horsepower, UD9A International diesel engine. Heavy drive. Price on application.

Carco D7 size model G towing winch..$1,500

Carco GY-54 towing winch, 4HD10 or D7 tractors $600

Isaacson heavy duty towing winch for D7 tractors $1,250

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P&H ⅝-yd. shovel, equipped with a 55-ft. crane boom, extra counterweight, tractor type tracks with 20-in. flat grousers, powered with a Chrysler industrial gas engine, three-speed transmission on the upper works. General appearance good $6,500

Insley ⅝-yd. shovel, equipped with a logging boom. Powered with a Chrysler 6-cylinder gas engine. Machine in operating condition, has fairlead for dragline operation $3,500

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Galion 10-ton 3-wheel steel roller, powered with Buda gas engine, engine has been completely rebuilt. Front wheel repaired. Checked and repainted. Put over $1,200 into repairs. Good operating condition. 30-day guarantee $1,750

Portable sawmill on heavy timber base, 48-ft. double track, 6-ft. x 9-in. carrier with two knees, single dog, (carriage could be lengthened for long lumber) friction feed works, 56-in. circle saw, 48-in. flywheel, one live feed roll, 25½-in. flat pulley drive, 18-ft. tail rolls. Anti-friction bearings throughout major portion of mill. This is a heavy-duty portable mill ..$3,000

WESTMONT TRACTOR CO.

150 E. Spruce — Missoula, Mont.

P. O. Box 1445

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Bucyrus-Erie 38-B shovel, powered with a Caterpillar D13000 diesel engine. Price on application.

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Ingersoll-Rand 315-cfm Gyro-Flo rotary air compressor. Powered with a GMC 371 diesel engine. Has the appearance and condition of a new machine. Excellent operating condition. Half the price of a new machine. Guaranteed 30 days $6,750

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How Bucyrus-Erie assures drum stability, trouble-free performance in 38-B shovel

ENGINEERING SERVICE THAT SAVES you time and money. Often our graduate engineer salesmen can solve your bearing problems on the spot. Working with you at the design stage, they can help you select the one Timken bearing—from the thousands available—that will do the best, most economical job for you. Our engineering experience plus the finest research and development facilities in the industry assure you greatest bearing value.

To keep its 38-B Shovel working steadily and trouble-free, Bucyrus-Erie engineers had to assure drum stability under toughest digging conditions to provide enduring alignment, trouble-free performance. To obtain this stability, the engineers mount the hoist and crowd drums on Timken® tapered roller bearings. They also use Timken bearings for the vertical transmission shaft and PTO.

Timken bearings assure stability because their tapered design enables them to take radial and thrust loads in *any* combination. Parts are held in rigid alignment, last longer and require less maintenance, too. What's more, they take the shock.

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Repower with AC 21000 diesel

Repowered with an Allis-Chalmers 21000 diesel, this truck now hauls more than 2,000 *extra* tons per week for L. J. Botcheller, Inc., Scranton, Pennsylvania.

...boost truck output 25%

L. J. Botcheller, Inc. put an Allis-Chalmers 21000 diesel into a truck used on coal silt mining at Carbondale, Pennsylvania, and boosted truck output 25 percent.

The truck body had been modified to carry a payload of 72,000 lb. Gross vehicle weight is 121,000 lb. Previously, five to seven 2-mile round trips were made per hour, with first gear used on grades. Now, with the new Allis-Chalmers 21000 diesel, the truck makes seven or eight round trips per hour and takes grades in second gear.

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AC

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